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ENTERIC FEVERS.

MISCELLANEOUS.

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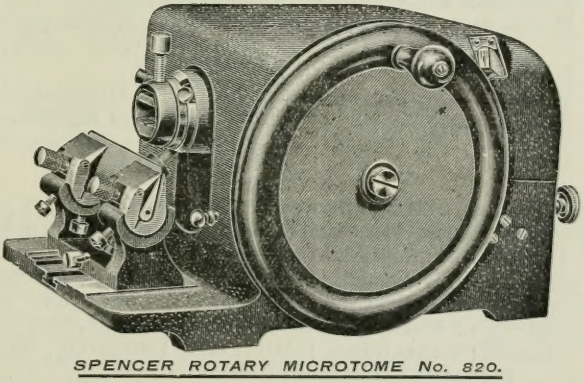

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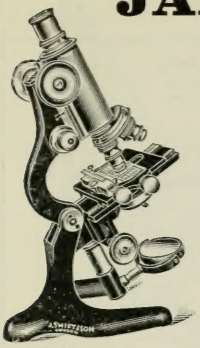

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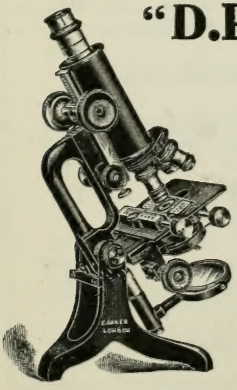

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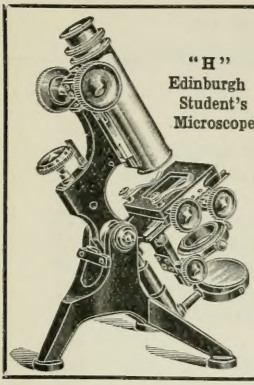

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By Lt.-Col. J. H. Tull Walsh, F.L.S., F.Z.S., I.M.S. (retd.).
Sectional Editor, Tropical Diseases Bureau.

The Managing Committee of the Tropical Diseases Bureau having called upon Sectional Editors for critical summaries of progress in our knowledge of the various diseases dealt with in the *Tropical Diseases Bulletin*, I have thought the occasion favourable for including a review of the work done by the Medical Officers attached to the Ministry of Health.* Their work covers certain years of the Great War, and leads naturally on to my critical summary. Their grasp is wide and includes, for cholera, the World.

In India, the home of cholera infection, the disease has become less prevalent. This is due in the main to improved sources of water supply, sanitary arrangements for religious fairs and pilgrimages, including shelter for travelling pilgrims, good food, good water, latrines and burning ghats, with guards to prevent bodies being thrown into the rivers. The cholera death-rate in the British districts of India was 1·18 per 1,000 of population in 1914, and remained low, being 1·12 for 1917. The total deaths, 1914–17 (inclusive), were 1,240,251. Figures for native states were not available. As regards monthly incidence during 1914–17, there is little calling for notice, but, speaking generally, the months, October, November, and December showed most sickness, with a distinct fall in January, February, and again a slight rise in March. Of the four years, three give an almost equal number of deaths (about 260,000), while 1915 was a bad year, showing 404,472 deaths. During that year Dacca district was swept by an epidemic and 52,452 persons died. In 1916 the deaths in Bengal fell to 70,836, the lowest record since the constitution of that Presidency in 1912. There does not appear to be much difference in the death rate for males and females ; riparian wards of cities suffer most, and this is especially noticeable among Hindus. As compared with Bengal, Bihar, Bombay and Madras, the Presidencies further north show a lower death rate, and it is instructive to note that in the North-West Frontier Province " there were no deaths from

* Ministry of Health, Reports on Public Health and Medical Subjects, No. 3. The Progress and Diffusion of Plague, Cholera and Yellow Fever throughout the World, 1914-17. By R. Bruce Low, with an Introduction by Sir George Newman. 1920. London : H.M. Stationery Office. [Price 7/6 net.]

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cholera in 1917." In 1914 the death rate per 1,000 of population was 1·13, sinking to 0·09 in 1916. The inhabitants are mostly Mahommedans. Burma, with its Buddhist people, also shows comparative freedom from cholera epidemics and the Sanitary Commissioner for Burma reports that " the prevalence of cholera is generally associated with the use of polluted water drawn from unprotected sources." " Towns are being provided with safer supplies." In Rangoon the disease is practically limited to that portion of the town to which the piped water supply has not yet been extended. The cholera death rate for Burma was exceptionally high in 1915 [cf. Bengal, etc.] viz., 1·79 per 1,000 as against 0·41 per 1,000 for five previous years.

In Ceylon there has been no serious outbreak except in 1916, when infection was introduced by the S.S. " Peiho " from Saigon with a labour party of 2,285 coolies from Annam, *en route* for Marseilles. We are told that " the information available as to the occurrence of cholera in the Chinese Empire is scanty," but readers of the *Bulletin* know that there have been many epidemics among its 400,000,000 [v. this *Bulletin*, Vols. 15 and 16]. Japan, an Island Empire, seems to get its worst outbreaks by importation from China. With the exception of 1916 there has been little cholera : five cases and four deaths in 1914, none in 1915. Apart from the danger from ships, islands were generally very free from cholera during 1914 to 1917.

The Report makes a sudden stride from the Haiwaian Islands to the British Isles, entirely free from cholera for years although cases have occurred on ships visiting our ports. In the war area cholera caused no trouble except in Prussian Silesia, Pomerania and in Austro-Hungary, where more than one serious epidemic occurred. *The Times* of October 19th, 1914, published a statement from its own correspondent at Rome that 10,000 cases had been reported in a single day, but this was not supported by the official communiqués. During 1915, Austria, Hungary, Croatia-Slavonia and Bosnia and Herzegovina furnished figures giving 41,454 cases with 21,751 deaths. Further East, until India with which we began is reached, epidemics occurred with increasing death-rate. This statement does not include Egypt, the Sudan or Africa generally. Excluding India, the rest of the British Empire, Canada, Australia, and New Zealand, ranks in freedom from cholera with the British Isles.

The greatest progress as regards cholera has been in the realm of prevention, the value of vaccines and the recognition of various strains and varieties of *V. cholerae*, the " comma " bacillus (Spirillum). The fact that bacteria, like other plants, vary and come into line with general evolution has slowly forced itself to the front ; and such expressions as " cholera-like " should be swept away. Bacteriologists have accepted certain tests and reactions for differentiating what is known as the type bacillus, as seen in Asiatic cholera :—

1. Growth in an alkaline culture-medium in which growth of other faecal bacteria is inhibited. Such media are : *Dieudonné's*, *Krumwiede's* and *Esch's*. It does not grow well on potato, and on the peptone solution the colonies are to be distinguished by their transparent, bluish-grey appearance with formation of a pellicle.

2. Nitroso-indol test : The production of " cholera-red " after 24 to 48 hours in Dunham's peptone solution (Witte's peptone) 1 per cent. with 0·5 per cent. NaCl in distilled water) to which 6–8 drops of strong H_2SO_4 have been added. It is necessary to remember that this violet-pink colour is not obtained with all samples of peptone sold.

3. Does not liquefy gelatine so rapidly as some vibrios, but these do not give the cholera-red reaction ; does not coagulate milk ; no gas production in solutions containing the usual test sugars.

4. Rapid motility ; pleomorphic, so that several tubes of the culture solution should be made and examined in the hope of finding the coccoid and rod forms which may occur.

5. Is scarcely pathogenic for pigeons, and more pathogenic for guinea-pigs than for rabbits.

6. Does not produce haemolysis on blood-agar as does the " El Tor " (Egypt) variety which otherwise (agglutination, etc.) resembles the type ; readily answers to the agglutinating serum in titre of 1 : 500 and even 1 : 10,000. As Hindus will not work with culture media which contain beef broth, they use mutton broth.

IYENGAR states that :—

" 1. Many of the growth characters on which the differentiation of species is made depend on conditions which are by no means fully worked out.

" 2. The failure to obtain specific reactions in organisms under test does not always justify the conclusion as to the divergence of the organism from the type, or as to the imperfection of the nutrient media.

" 3. Pellicle formation by the cholera vibrio, and probably indol formation, is dependent on the alkalinity of the medium used.

" 4. The highly nutritive character of the medium is probably a determinary factor in the production of pellicle by *V. cholerae*." [This *Bulletin*. Vol. 17, p. 402.]

These characters being accepted, any other " comma " bacillus producing clinical cholera can be included as a variety.

In the matter of prevention, the use of vaccines has been of the greatest value. The question of prophylaxis was urgent in 1915 when the enormous armies were in formation and when cholera was known to be raging in Russia. Early experience in India was recalled (SIMPSON, W. J.) when Haffkine's vaccine was used. Even then it was shown that with uninoculated and inoculated living side by side in similar huts the giving of a living vaccine lowered the mortality in one epidemic from 10·86 per cent. to 2·99 per cent. Using a strong vaccine with larger numbers (over 13,000), the incidence in the uninoculated was 3·02 per cent., whilst among the inoculated it was only 0·47 per cent. As far back as 1885–86 FERRAN, in Spain, treated 40,000 persons with a vaccine of living cholera vibrios, a somewhat rash act followed by disaster. Since, as will be noted, cholera vibrios vary in action and virulence, it is best to prepare a vaccine from the first cases of each epidemic (using a stock vaccine, at once, when infection is detected). A good example of a stock vaccine is that mentioned by Oscar TEAGUE, as used in North America. It consists of a culture of *V. cholerae* grown on alkaline nutrient agar, suspended in physiological salt solution and killed by heating for one hour at 53° C. Another good stock vaccine, used in India and issued by Colonel Glen LISTON from the Bombay Government Laboratory, contains 8,000 million organisms per cc. ; 0·5 cc. is given as a first injection and 1 cc. for the second. The Kasauli Laboratory also furnishes a vaccine which has been used with success, as may be seen by reference to Vol. 16, pp. 40–41. At Hurhuru, during an epidemic, the death-rate among the uninoculated was 64 per cent. ; among the inoculated it was only 37·5 per cent. (Ashutosh ROY). KOLLE's results in 1913 (Vol. 16, p. 41) show that with 91,224 persons

protectively inoculated and 8,968 unprotected, there was, among the inoculated, a sick rate of 0·7 per cent. and a death-rate of 10·2 per cent.; while for the smaller number of uninoculated the figures were 9·3 per cent. and 27·5 per cent. Very little work has been done with "lipo-vaccines" recommended by Le Moignic and Sézary [Nouvelle méthode de Vaccination Anti-typhoïdique, 1918. Baillière et Fils (Paris).] This little book was reviewed by the writer of this summary, and he believes the "lipo-vaccine" to be of value. Reasons for this belief will be found in Vol. 12, pp. 361–363. One objection offered to the use of vaccines suspended in oil is that bacteria resist a higher temperature in oil than in a water solution. This might be overcome. The experiments of Stanislaw Sierakowski are of interest, and his tables of results show the effect of method of preparation on agglutination [Vol. 17, p. 403–404].

Since the "El Tor" strain produces haemolysis in blood cultures, it might be advisable to avoid the use of this variety for vaccines. Working in Japan, Korea and Formosa, Watanabe (Y.), Kawatani (S.) and Watanabe (W.) obtained from previous epidemics in different geographical areas 56 strains. These, when studied and compared with the *V. cholerae* found in the 1920 outbreak, showed that the 1920 strain exhibited little difference from the one which caused the 1916 epidemic. Some of the strains cultured produced fairly strong haemolysis. Only one specimen from Korea agreed in character with "El Tor 1906." Major J. C. McCombie Young has pointed out that protective inoculation has a distinct economic value. Writing in the *Indian Med. Gaz.*, 1919, pp. 407–410, he says, speaking as *ex-officio* Superintendent of Emigration: "By the third week in March inoculated coolies began to appear upon the railway routes, and by the fourth week in March most of the emigrants travelling to Assam, whether by rail or by river, had been inoculated with a single dose of cholera vaccine before commencing the journey. Those who have been concerned with the work of inoculations are curious to ascertain the results of their labours, and those who have met the cost of it wish to know what they have received for their money. The ratio of deaths per mille of emigrants travelling was for March 15th to 21st 8·50, with an average of 6·78 for January, February and March to the 21st. After the introduction of prophylaxis the ratio fell and gave an average of 1·8 per mille from March 22nd to May 31st."

In addition to the elucidation of the characteristics of various strains of vibrio, it is now known that the cholera toxin destroys the alkalinity of the blood, producing an "acidosis" which leads to that late and most dangerous condition—cholera uraemia. It was this discovery by Sellard and Rogers which led the latter to add bicarbonate of soda to his hypertonic salt solution. This bicarbonate becomes converted into carbonate, and readjusts the normal alkalinity of the blood, the saline fluid supplying that lost in the vomit and "rice-water" stools. In the *Brit. Med. Jl.* for June 1919, Professor Bayliss suggests the addition of gum acacia to the alkaline hypertonic salt solution, hoping to prevent the further escape of fluid from a blood circulation damaged by the cholera toxin. Sir Leonard Rogers tried this method and wrote [Vol. 14, p. 183]: "The failures have been a great disappointment to me, but I believe the explanation to be that the gum solutions lead to the retention, in the circulation, of the deadly cholera toxins." The addition of gum to saline solutions, used

during the war in cases of uraemia and surgical shock, had proved of great value ; but the conditions met with in cholera are different owing to the effect of the special vibrio toxin. Professor BAYLISS based his suggestion on his experience in other fields. He found that with regard to the excretion of certain other toxins through the kidneys, one of the most striking facts was the restoration of the flow of urine, by gum-saline, when it had stopped from various causes. Benjamin MOORE, in the *Brit. Med. Jl.*, 1919, Oct. 18, pp. 490–492, pointed out that the results obtained by BAYLISS and ROGERS were not absolutely contradictory but in keeping with the findings of French workers on anaphylaxis. Firstly the positive effect of a colloid, such as blood-protein, gelatine or gum acacia in shock due to haemorrhage, surgical injury, etc., as compared with the effect of simple hypertonic salines, is that the situation is one of a circulating fluid not merely defective in total volume as in cholera where the blood is thick and " tarry " ; but poor in colloid compared to salts as in the conditions above noted. In these latter conditions the gum serves to anchor inorganic salts preserving equilibrium—and thus alkalinity—not only in the blood vessels but in the cells of the brain and heart. Secondly the inefficiency of gum solutions in cholera is due to the presence of excess of toxic cholera colloid. MOORE further points out that : " free saline in the blood, in such diseases as cholera, combines with toxins to form a crystallo-colloid union, and this is an essential factor in excretion of the poison by the intestines and kidneys."

SANARELLI and CANTACUZÈNE [Vol. 15, pp. 80–81] found that vibrios injected into the peritoneal cavity of guinea-pigs settle in the walls of the intestine, and the latter author writes :—

" By whatever point the cholera vibrio enters the body it makes for the intestines and always finally reaches the walls of the small gut (as in nearly all initial infections of human beings). There it pullulates. . . . One is struck at autopsies of acute cholera cases by the fact that vibrios are often rare in the contents of the small intestines. Investigate the mucous membrane deprived of its epithelium : there they pullulate and at the same time undergo a vibriolysis, the more intense as the toxic phenomena are more acute. It seems that the mucous membrane contains some substance which acts upon the cholera vibrio in such fashion that it increases both virulence and its power to produce toxin."

The experiments of CANTACUZÈNE and MARIE showed that a small dose of extract of small intestine of the guinea-pig, or of the caecum—quite harmless when injected alone—when added to a non-lethal dose of vibrios and injected into the peritoneal cavity, sufficed to cause an acute and fatal cholera intoxication. Thus : 10 guinea-pigs which received vibrios (from culture) plus extract of intestinal mucous membrane (guinea-pig) died in 3–11 hours ; the two controls inoculated with the same dose of the culture only, showed no signs of illness. The intestinal extract from ' vaccinated ' animals was found to protect against even a mortal dose. The conflict between the cholera toxin and the body cells is, more or less, confined to the small intestines. The vibrio rarely invades the body. It is, however, liable to invade the gall-bladder as GREIG has shown in a plate, reproduced in Vol. 15, opposite p. 70. Here it may remain after it has disappeared from the intestines where it meets with bacteria which are inimical to the development of the " comma." Such are : *B. pyocyaneus, B. proteus, B. lactis aërogenes* and *Streptococcus faecalis*. Thus the gall-bladder is the home of *V. cholerae* in the " carrier," and, as it may remain for some

time in the bile, there may be, and probably is, a slow auto-inoculation giving permanent immunity to the "carrier," although he is a danger to others.

The artificial immunity following vaccination lasts, so far as we at present know, only for about four months; but second attacks of cholera are almost unknown. The danger in the case of the "carrier" lies in the escape, from time to time of vibrios from the intestines, and outside the body these may become the origin of epidemics. GREIG (*Edinburgh Med. Jl.*, 1919, Vol. 23, pp. 4–22), describes the production of a carrier by experiment. Living vibrios were injected into the ears of rabbits, animals more resistant to cholera infection than guinea-pigs or than man. They passed into the bile from which they could be obtained in pure culture, but no symptoms of cholera occurred. If further injections into veins are made, cholecystitis occurs, with formation of calculi round a nucleus of "commas." Still no pathogenic results, and GREIG has found such calculi in rabbits which had received the last inoculation a year previously. Although, as stated, the "comma" rarely invades the body generally, it has been occasionally found in small pneumonic areas after death. It is rarely isolated from the blood of the patient. GREIG's attempts were always followed by negative results. Out of 55 cases in which the urine was examined the vibrio was found only in 8. Two of these had completely recovered and were at work. Such "carriers" might at any time be a source of danger. They should be kept under observation. Old cultures of the "El Tor" vibrio—1913–16—do not form good material for experiments on rabbits as shown by the work of CRENDIROPOULO. He required a strain which would enable him to compare the effects of cholera poison given by various routes: mouth, rectum, through veins, and by inter-peritoneal injection. Discarding the "El Tor" strain he preferred to work with a vibrio brought from a patient in Annam (1916). He found that vibrios injected into the rectum passed—in 75 per cent. of the experiments—up the gut and that the lethal dose was from 1/50 to 1/100 of a culture. 1/100 of a culture injected into veins of the ear often produced no effect and the vibrios were eliminated by the bowel. 1/30 was lethal and by the intraperitoneal route it required 1/15 of a culture to produce any pathological results.

As regards agglutination, the response, negligible in fatal cases, is generally well marked; even in mild cases, the titre showing formation of antibody may be very high. TANOUE and WATANABE found a positive agglutination in 87 per cent. of their cases. The reaction was seen on the third or fourth day, generally within ten days, and disappeared somewhat rapidly after the third week. In most cases the titre was from 1/100—1/400, and the highest was 1/10,000. In an epidemic which occurred in Manchuria during 1920, SHIIBA and OYAMA found the serum obtained from patients showed very great individual variation in the immunity index. Generally speaking the agglutination titre was higher in Japanese than in Chinese, and the maximum was reached about the second or third week. For details *see* Ohshima's summary (Vol. 17, p. 405).

A strong test serum should be used and one that is known to agglutinate the type vibrio. With such a serum GREIG found in the excreta of cholera cases, in India, vibrios which did not agglutinate, although morphologically like type *V. cholerae*. Moreover, they, like the "El Tor" variety from Egypt, haemolyse the red blood corpuscles. These may be, he thinks: (*a*) True cholera germs which have lost certain

attributes, or (*b*) foreign bacilli partly humanized, that is only partly adapted to parasitic life in man. Other vibrios have been described: "Izonso" and those which CASTELLANI proposed to call para-cholera germs, viz., *V. kegallensis*, *V. El Tor* and *V. Gindha* from Erythrea. These latter, like the germs noted by GREIG are not agglutinated by the "type serum." VON EISLER (this *Bulletin*, Vol. 15, p. 82) describes the haemolytic action of the "Kadi-Kjo" vibrio.

As to climatic effects on the occurrence of epidemics, work in India (GREIG and others) has shown that cholera returns with the spring months and shows "every year the same phenomena as the epidemic increases." In the "rice-water" stools only true cholera vibrios occur. As the epidemic reaches its highest point and begins to decline the "pseudo-cholera" germs begin to appear, becoming more numerous as the disease dies out. Using the serological test they may be arranged in groups. It would seem therefore, that the varieties observed by GREIG come under (*a*) and are not true botanical varieties as are those elsewhere recorded.

Fresh light has also been shed on the life of *V. cholerae* outside the human host. GREIG carried out the only kind of experiment which can be accepted as trustworthy. Earlier experiments were, in most instances, carried out with old "cultures." He took the "commas" direct from the stools of patients; they were kept in the dark, protected from the bactericidal influence of the Eastern sun, in flasks, at room temperature. The number of vibrios was estimated daily until the flasks were free from living germs. The following table gives some idea of the saprophytic life of vibrios thus taken direct from the patient.

Month in which Examination was Made.	Number of Cholera Stools Examined.	Duration of Life in Days.		
		Minimum.	Maximum.	Average.
December, 1912 ..	9	10	10	3·6
January, 1913	6	1	12	6·6
February	13	3	17	7·7
March	20	1	13	6·5
April	22	1	5	2·8
May	10	1	3	1·4
June	15	1	2	1·2
July	—	—	—	—
August	4	1	12	6·0
September	3	4	5	4·3
October	3	3	4	3·7

Temperature forms an important item in shortening the extra-corporeal life of the cholera vibrio. In Calcutta the cold season life is longer than the life during the hot and rainy months. This is shown more or less, in the above table. GREIG's work was done in Calcutta, where the temperature ranges from a mean maximun of 102° F. in May, to 48° F. the mean minimum of January. The months in which an epidemic is most to be feared are the colder winter months (in India at any rate), since with lengthened extra corporeal and saprophytic life, there is, when vibrios are expelled by "carriers," a greater possibility of water and food infection. Test-tubes and media used for cultures should be destroyed by fire. Similar results were recorded by Otto SCHOEBL for the extra-corporeal life of cholera vibrios in water in Manila [Vol. 6, p. 38].

The only other important progress to be noted has been in the treatment of cholera in the early stages, during the reaction period and in post-choleraic uraemia. This division into stages is a matter of custom and convenience, but all these conditions are progressive effects of the cholera toxin. ROGERS and COX in India and China, with CADBURY and HOFMANN in America, saw that it was necessary to replace the fluids and salts lost during the early stages of the disease. A simple physiological salt solution would not stay in the blood-vessels, and hypertonic salt solutions were tried with a wonderful success, as shown by the lowered death-rate. To this, Sir Leonard ROGERS and his co-workers added other salts required and rendered the fluid, used for treatment, alkaline. A very good summary of modern treatment is given by A. G. VARIAN [Vol. 15, p. 83; see *Dublin Jl. of Med. Sci.*, 1919, pp. 66–74]. The points to be kept in view are: (1) To replace the lost fluids and salts by hypertonic saline intravenous injections, giving sufficient to raise the blood-pressure to normal and to keep it normal until all danger is past. The following are some of the solutions that have been employed with success:—

(*a*)	Sodium Chloride	120 gr.
	Calcium ,, ...	4 gr.
	Potassium ,, ...	6 gr.
	Water to	1 pint (Varian).
(*b*)	Sodium Chloride	8·0 gm.
	Calcium ,, ...	0·25 gm.
	Potassium ,, ...	0·40 gm.
	Water	568·0 cc. (Wu Lien Teh and Chun).

The addition of the alkali is not absolutely necessary unless there are signs of anuria and uraemia pointing to acidosis. In such cases the use of alkalis injected into the veins has been followed by a reduction of the death-rate in post-choleraic uraemia by 70 per cent. The alkaline solution should be of the following strength:—

Sodium Chloride	60 gr.
,, Bicarbonate	160 gr.
Water to	1 pint.

The amount of saline fluid required during the early stages of an attack of cholera, in order to prevent collapse, is gauged by watching the blood-pressure (pulse beats) and the specific gravity of the blood. Pressure is generally estimated by a sphygmometer, "Riva-Rocci" or other pattern, and the specific gravity of the blood is estimated by the "drop method" in known stock solutions. The danger point as regards pressure is 70 mm., and when the sphygmometer shows such a record, injections must be given at once until 105 mm. at least, is attained. A specific gravity above 1,032 requires attention, and, as a rule, with specific gravity of 1,066 about 4 pints must be used to lower it to as near normal as possible (1,032). Above 1,066, 6 pints should be injected. The hypertonic saline is injected at body temperature unless there is a high temperature; it should then be as many degrees below 100° F., as the patient's temperature is above that figure.

There has been nothing reported in the medical literature of cholera to show that anti-cholera vaccines are of any use in treatment. Atropin and adrenalin have been added to the saline fluids in order to stimulate the heart.

In the *China Med. Jl.*, 1920, pp. 243–258, will be found papers on treatment (*v.* this *Bulletin*, Vol. 16, p. 434) by Messrs. BRAAFLADT, WYLIE and SNELL: Out of 100 cases 41 received the recognized

" saline " treatment only ; of these 9 died (22 per cent.) ; 24 received " saline " plus Kaolin, 3 ounces in water by the mouth, with 7 deaths (29 per cent.) ; 35 Kaolin only, with 1 death (2 per cent.) ; but it must be stated that the majority of the Kaolin treated cases were classed as less severe, whereas the majority of the others were " more severe " (BRAAFLADT). Blood-pressure was not taken. Dr. WYLIE did not try any treatment except the orthodox one ; and was careful to take the blood-pressure of his patients. " If the blood-pressure was down to 80 mm., or the specific gravity of the blood was up to 1,063, we gave an intravenous injection of hypertonic saline, using 3 pints for 1,063, 4 for 1,064 " ; and so onward. The point noteworthy in Dr. SNELL'S paper is that he considers " treatment of the kidneys " as the most important issue. In 62 cases casts were found in the urine of 48. Five patients died before a specimen of urine was obtained ; they may have had casts in the urine. Blood-pressure was estimated by Dr. WYLIE with a Tycos instrument.

In the *Indian Jl. Med. Res.*, 1918, Vol 5, pp. 570–609, will be found an interesting paper by J. A. SHORTEN on the biochemistry of post-choleraic uraemia. In 1914, working in Calcutta with Sir Leonard ROGERS, he began investigations into the variation of alkalinity of the blood. Stopped by the war, this investigation was resumed when carnage apparently had ceased. The work was carried out in the Medical College Hospital for Indian patients, and the main object of the investigation was to determine the increase, if any, in the urea content of the blood. Other factors considered in the research were : titration alkalinity, percentage of inorganic phosphates and chlorides in the serum ; the following are the valuable results obtained, as an average in 10 healthy Bengalis : urea, 0·037 per cent. ; alkalinity N/32·8 [this is generally about N/35 in normal Europeans] ; P_2O_5, 0·0145 per cent. ; NaCl, 0·608 per cent. Percentage in these results equals gms. per 100 cc. of blood. In choleraic uraemia there was an increase in urea and in P_2O_5. Sodium chloride was absent in one case and gave a percentage of 0·637 in another. Alkalinity was decreased : showing N/50 and N/90. Dr. J. C. MUKARJI has found that lime water is distinctly inimical to the growth of *V. cholerae* if used in sufficient quantity. As fluid is so useful this might with advantage be given freely as a drink to cholera patients, alone, or as the vehicle for Kaolin, thus helping to wash vibrios out of the intestines. There is, of course, little, if any, absorption of drugs in the stomach, but in the early stages an acid drink would be useful to wash out that organ. Emetine has been used in some mild cases, and since it provokes a flow of bile it is no doubt useful.

On general sanitation it is not necessary to make any remarks since it is the same for all water and food-borne infections. There are improved septic tanks and improved latrines for oriental races and improved water supplies are being introduced in India, etc., when funds permit.

TROPICAL OPHTHALMOLOGY.

Fischer (E. C.). **The Prophylaxis of Trachoma.**—*Bull. Ophthalm. Soc. Egypt.* 1920. pp. 1–14.

Fischer brought up the important subject of the prophylaxis of trachoma for discussion by the Society, and advocated (1) the extension of the system of ophthalmic hospitals, and (2) the education of the people. Under the latter heading, he would organize propaganda in the hospitals and ophthalmic centres, and also in the mosques, schools, newspapers, and homes. He would make use of the Provincial Councils and other executive bodies, and, above all, he would have attention paid to the girls, who are to become the mothers of the race. In the discussion which followed, there was considerable difference of opinion as to the best course to pursue, and a considerable tendency towards pessimism was exhibited. It was decided to nominate a committee to study and report on the problems connected with trachoma in Egypt.

R. H. Elliot.

MacCallan (A. F.). **The Pathognomonic Signs of Trachoma.**—*Bull. Ophthalm. Soc. Egypt.* 1920. pp. 15–16.

The paper by MacCallan is tantamount to the admission that for the diagnosis of true trachoma, we must await the late evidences of cicatrization. It, however, provides no help in the early stage of the cases, and it is with these that differential diagnosis is most interested.

R. H. E.

Abboudy (A.). **Traitement de l'ulcère cornéen trachomateux.**—*Bull. Ophthalm. Soc. Egypt.* 1920. pp. 17–21.

Abboudy, for this condition, advocates the daily rubbing of the conjunctiva with a solution of cyanide of mercury (1 in 500) on a woollen swab, the lids being everted for the purpose. In the presence of troublesome recurrences of the corneal ulceration he adopts the procedure of Abadie, which consists in making a series of punctures with the thermo-cautery into the upper cul-de-sac, each puncture being a centimeter in depth, and 3 or 4 mm. distant from each other; four or five such punctures are made in all. He follows up the operation with the daily cyanide treatment above described, and claims to have obtained excellent results thereby.

R. H. E.

Seddik (Zaki). **Fleshy Pannus and its Treatment.**—*Bull. Ophthalm. Soc. Egypt.* 1920. pp. 25–28.

Seddik describes the various methods of treatment in vogue for this condition, and advocates the scraping of the cornea combined with Heisrath's operation, with a view to shortening the disease, and anticipating the natural process of cicatrization. In the discussion several speakers supported the claims made.

R. H. E.

Stuckey (E. J.), Tomlin (H.) & Hughes (C. A.). **Trachoma among the Chinese in France.**—*Brit. Jl. Ophthalm.* 1920. Jan. Vol. 4. No. 1. pp. 1–12.

This paper describes how the Chinese coolies in France were medically examined, classified and organized with a view to preventing the spread of trachoma in Europe. The diagnosis, bacteriology, treatment and prophylaxis of this condition are dealt with at some length. This communication not only impresses one with the thorough way in which the work was done, but also indicates that in this instance, at least, square men were not put into round holes.

R. H. E.

Lea (J. Augustus). **The Treatment of Trachoma.**—*Brit. Jl. Ophthalm.* 1920. Sept. Vol. 4. No. 9. pp. 417–418.

Lea asserts that the cases of trachoma met with in South Africa resemble the oriental type, described by Stuckey, Tomlin and Hughes, which differs in material points with that met with in this country. He recommends the use of an instrument like a tattooing needle, bent at right angles; this is dipped in a mixture of equal parts of strong acetic acid and water, and is then used to prick each granulation in turn. If the granulations are very numerous, he scarifies the part with the instrument, wet with the acid solution. Anaesthesia is obtained by the use of cocaine and adrenalin, and the excess of acid is washed away.

R. H. E.

David (J.). **Prophylaxie des Ophthalmies en Orient.**—*Presse Méd.* 1920. Nov. 17. No. 84. pp. 828–829.

This paper by David is certainly arresting, and if his contentions can be made good by the experience of others, the work promises to be epoch-making. He uses a 1 per cent. solution of sulphate of zinc, to which is added 5 per cent. of a 1 in 1,000 adrenalin chloride solution; two drops of this solution are instilled daily into healthy eyes. He claims that by this treatment, he was able to keep a school in Lower Galilee, and a number of workmen in the neighbourhood, absolutely free of acute conjunctivitis, which was raging in the surrounding population. This was in 1913–14. On returning to Palestine in 1919, he had an equally extraordinary experience with 800 school children. The treatment was suspended for three weeks; conjunctivitis then broke out in the school, and at once disappeared when the treatment was resumed. There was not a single case of fresh trachoma among the subjects thus treated, which David explains on the ground that these other infections pave the way for the implantation of the trachoma virus.

R. H. E.

von Skramlik. [**Argyrosis of the Lachrymal Sac.**]—*Klin. Monatsbl. f. Augenheilk.* 1915. Apr.–May. p. 443.

The patient had used a 1 per cent. solution of silver collosol intermittently for a year. There was marked staining of the conjunctiva; the removal of the sac permitted a microscopic examination of the walls of that structure, whose sub-epithelial connective tissue was diffusely

stained of a brown colour. In addition to this brown stain, both the superficial and deep structures of the sac wall showed a number of granules, grey to black in colour, and lying either within the cells or as a deposit on the elastic fibrils present in the walls. Von Skramlik considers that the brown coloration, met with in these cases, is due to the formation of an albuminate of silver, while he regards the granules as deposits of metallic silver. Apart from the interest of these investigations in affording us an exact knowledge of the pathology of silver-stained tissues, there is a lesson for every practitioner in the tropics, viz., that we cannot pour in *any* silver preparation without a risk, or even more than a risk, of producing argyrosis. Each new form of silver-containing drug has been boomed as free from the danger of producing argyrosis, a claim which time has invariably destroyed.

R. H. E.

Neal (James Boyd). **Diseases of the Conjunctiva as met with in Tsinan.**—*China Med. Jl.* 1920. Sept. Vol. 34. No. 5. pp. 475–478.

Neal comments on the vast preponderance of diseases of the conjunctiva in tropical ophthalmic practice; these constituted nearly 50 per cent. of the total cases in one year and 60 per cent. in another. Phlyctenular conjunctivitis is extremely common, constituting from 1/6th to 1/7th of the total cases; it is most prevalent in spring and autumn. The cases of granular conjunctivitis are about on a par in numbers with those of the phlyctenular disease. Purulent conjunctivitis is rare in Northern China, only occurring in from 1 in 120 to 1 in 145 of new cases. In view of the frequency with which gonorrhoea is met with in China, Neal considers that the low figure for purulent ophthalmia is to be explained by the cleanly habits of the Chinese, who wash their hands diligently after any possible contamination. Pterygium is very common in China, as it is in all other hot, dusty lands.

R. H. E.

Comberg (W.). [**On Swimming Bath Conjunctivitis**].—*Zeitschr. f. Augenheilk.* 1920. Vol. 44. Part 1–2.

Comberg's investigations into a severe epidemic of swimming bath conjunctivitis in a well-built and well-cared-for swimming bath in Berlin are of special importance to those interested in tropical ophthalmology, for they show how the conjunctiva may be readily infected from contaminated water, and suggest a possible line of investigation in the aetiology of the epidemics of conjunctivitis with which we are so familar in Eastern countries. It may well be that contaminated water, in the tropics, at certain times of the year, may be one of many possible factors in the production and dissemination of these epidemics. [The subject is one that may well be commended to the attention of workers in Eastern lands, both for its intrinsic interest, and for the valuable results that may be attained by such investigations.]

R. H. E.

MacCallan (A. F.) & Beaton (E.). **Gonococcal Conjunctivitis in Egypt.**—*Bull. Ophthalm. Soc. Egypt.* 1920. pp. 53–55.

These writers draw attention to the differences, familiar to tropical practitioners, between gonococcal conjunctivitis, as seen in Egypt and in some other tropical and sub-tropical countries, and in Europe : (1) It usually results from contagion acquired from another conjunctiva instead of from the genital organs ; (2) it is frequently sub-acute or chronic in course ; (3) it shows definite seasonal variations, becoming epidemic as the atmospheric temperature rises ; (4) it is a far less virulent disease than that met with in Europe, the cornea often escaping. The present research was undertaken to ascertain whether the Egyptian disease is truly gonococcal, or whether the organism responsible is a different one with similar morphological characteristics. The results obtained so far all point to it being the former, and Beaton has now commenced a further study by preparing immune sera, with the object of throwing light on the specific vital characteristics of the Egyptian conjunctival organisms as compared with genital gonococci.

R. H. E.

Blanc (Georges). **Conjunctivite phlycténulaire et pédiculose.**—*Bull. Soc. Path. Exot.* 1920. Oct. 13. Vol. 13. No. 8. pp. 645–646.

Blanc has noticed a close connection between pediculosis of the scalp and phlyctenular conjunctivitis, both in France and at Tunis. It is of peculiar interest that the connection between these two conditions held in his tropical practice equally for Europeans and for Arabs. He has had similar experiences both at Athens and in Crete. To confirm the connection, he injected into the eye of a monkey an emulsion of ground-up lice, and produced a typical phlyctenular conjunctivitis a little over two months after the inoculation.

R. H. E.

McAll (P. L.). **Notes on a Rare Form of Subconjunctival Granuloma, met with in Central China.**—*Brit. Jl. Ophthalm.* 1920. Jan. Vol. 4. No. 1. pp. 20–25. With 8 figures; and *China Med. Jl.* 1921. Jan. Vol. 35. No. 1. pp. 26–30. With 7 figures.*

In this interesting condition the sight is partly or entirely obstructed by the formation of tumour-like masses, which grow between the eyeball and the lids. No form of inflammation is present ; there is no pain, and no tendency of the growths to break down. Most of the patients are men ; their ages run from 15 to 40. The progress of the disease suggests that the tissue beneath the conjunctival fornix is hypertrophying, and slowly pushing the conjunctiva before it in the form of a fold between the globe and the lids. By degrees the conjunctiva and lids are themselves involved, the palpebral masses bulging forward very markedly. No infection can be traced as responsible for the trouble. Operation is of no avail, as it merely leads to cicatrisation, and does not prevent recurrences of the growth. The bulk of the tumour is composed of round cells (lymphocytes), which infiltrate the normal tissues.

R. H. E.

* The illustrations to McAll's paper are reproduced in Elliot's "Tropical Ophthalmology" (Oxford Medical Publications), Figs. 86–92.—Ed.

Henderson (E. Erskine). **On a Rare Form of Subconjunctival Granuloma met with in China.**—*Brit. Jl. Ophthalm.* 1920. Vol. 4. p. 93.

Henderson suggests that the tumours described by McAll are almost certainly parasitic, and either protozoal or helminthic; he suggests a careful blood examination for eosinophilia.

R. H. E.

Motais (F.). **La Sparganose Oculaire.**—*Arch. d'Ophtalm.* 1918. Sept.–Oct. Illustrated.

Motais publishes a case in which the presumed larval form (*Sparganum mansoni*) of *Bothriocephalus liguloides* was removed from the eyelid of a boy of 11, whose whole life had been spent in Hué (Annam). Occasional redness of the eyes and oedema of the lids had been noticed for about a year, in association with a swelling of the upper lid of the left eye. The tumour had slowly increased in size, was the size of a haricot bean, was movable and elastic to the feel, and lay at the upper, outer portion of the lid in the connective tissue and in contact with the palpebral conjunctiva. It was easily removed, and the larva was found imbedded in rather dense, vascular tissue, surrounded by fat, and lying in a cavity which contained fluid. The condition called "ocular sparganosis" is well known in Japan and in the Tonkin delta.

R. H. E.

Pacheco-Luna (R.). **Contribution to the Study of Onchocerchosis.**—*Revista Cubana de Oftalmologia.* 1920. Jan.–June. Vol. 2. Nos. 1 and 2. pp. 80–99.

Pacheco-Luna is the first to draw attention to the presence of eye lesions in patients attacked by the filariform nematode *Onchocerca volvulus*, which is of common occurrence amongst the West African negroes. The skin tumours, which contain the worm, are well known in Guatemala, and the condition is spoken of there as "Coast Erysipelas." The eye condition reminds Luna of Fuchs' "superficial punctate keratitis." The course of the trouble is exceedingly prolonged. It may eventually end favourably, though traces of the trouble are always left permanently; on the other hand, serious irido-cyclitis may come on, with disastrous consequences. The removal of the skin tumours is the only rational treatment of the condition, and the results of this method of dealing with the case are brilliant so far as the symptoms are concerned. The paper contains a description of the parasite by T. M. Izquierdo, to whom Pacheco-Luna sent specimens of the skin tumours, taken from cases in which eye symptoms had been present.

R. H. E.

Wright (R. E.) & Patton (W. S.). **A Case of Myiasis of the Frontal and Ethmoidal Sinuses and the Orbit.**—*Indian Med. Gaz.* 1921. Feb. Vol. 56. No. 2. pp. 58–59. With 1 text figure.

Wright's patient was a Hindu woman of 30, whose supra-orbital and inter-orbital regions were alive with maggots; the bones had been extensively attacked; the surrounding sinuses were freely involved; the dura was not exposed. The eyeballs were exposed, proptosed, and

pushed outwards ; the cornea of one of them was ulcerated. There was marked oedema and a foul discharge. The cavity was irrigated with permanganate solution, and turpentine applications were made ; 50 maggots were removed the first day and 30 the next. Chlorine solution was substituted for the permanganate, and iodoform packing adopted. The prognosis was stated to be good for life, but poor for sight. The extrinsic muscles of the eyes had been extensively destroyed. Patton identified the maggots as the mature larvae of *Chrysomyia bezziana* Villeneuve.

R. H. E.

Sobhy (Mohammad) & El Kattan (Mahmoud Azmy Mohammad). **A Probable Case of Monilethrix affecting the Eyebrows and Eyelashes.**—*Bull. Ophthalm. Soc. Egypt.* 1920. pp. 43–47.

The clinical features of this interesting case are described and the previous literature is discussed. Notes of a further case of the same kind were contributed by Dr. Azmy in the course of the discussion.

R. H. E.

Kirkpatrick (H.). **An Epidemic of Macular Keratitis.**—*Brit. Jl. Ophthalm.* 1920. Jan. Vol. 4. No. 1. pp. 16–20. With 2 illustrations.*

Kirkpatrick calls attention to a hitherto undescribed form of keratitis occurring in India in a mild epidemic form. No bacteria or other organism could be identified as the cause of the trouble ; there is a singular lack of local reaction ; there is an apparent absence of contagion ; one eye only is usually attacked ; the patients show no constitutional defect. Three types are described : (1) A superficial punctate keratitis ; (2) a large patch of keratitis is found, with a dense linear portion from which the opacity fades away into the healthy cornea ; one or two soft, detached spots are found in the neighbourhood ; (3) a single spot only is present ; this is dense, circumscribed and often slightly raised. Ulceration is characterised by its absence in all the forms. The disease would seem to have affinities with the conditions described by Herbert in Bombay and by Westhoff.

R. H. E.

Kirkpatrick (H.). **The Use of Magnesium Sulphate as a Local Application in Inflammation of the Conjunctiva and Cornea.**—*Brit. Jl. Ophthalm.* 1920. Vol. 4. p. 281.

Kirkpatrick advocates the use of strong solutions of magnesium sulphate (from gr. 40 *ad* ʒi, up to saturation) as an eye bath, for five minutes at a time, every two or three hours, in suppurative inflammations of the cornea, in trachomatous eyes suffering from secondary infections, in many chemotic conditions met with in the tropics, and in the early stages of panophthalmitis. Pain is lessened, swelling and oedema are reduced, and many conditions are very favourably influenced.

R. H. E.

* The illustrations to Kirkpatrick's paper are reproduced in Elliot's "Tropical Ophthalmology" (Oxford Medical Publications), Figs. 82 and 83.—Ed.

Ganguly (S. K.). **Off-Hand Diagnosis of Cataract.**—*Indian Med. Gaz.* 1921. Apr. Vol. 56. No. 4. pp. 131–133.

Ganguly protests against the slovenly diagnosis of cataract and the insufficient data of a lightning examination, and warns medical men in India against such a practice. He gives a list of the conditions thus mistaken for cataract, which includes refraction errors, glaucoma, and optic atrophy. The reviewer can testify that the warning is not unneeded in Indian practice at least, and he trusts that it will not be unheeded.

R. H. E.

Pi (H. T.). **Native Ophthalmic Practice in China.**—*Nat. Med. Jl. China.* 1920. Sept. Vol. 6. No. 3. pp. 188–196.

The theories of Chinese ophthalmology, as described to us by Dr. Pi, are amusing rather than instructive. It seems a little hard on a class of people who suffer much to read of them that "cataract is often seen in people who have bad temper." Before the day for cataract operation, a suitable hour is selected by the fortune-teller. The instrument used is a gold needle, one eighth of an inch thick and three inches in length; two-thirds of it are set into a bamboo handle and fixed there by wax or silver. The patient sits upright on a stool facing daylight. An assistant steadies his head. The patient is not allowed to shout or talk during the operation. The doctor is warned not to be nervous lest his hand should tremble. It is stated that needling is aimed at, though, to the reviewer, the likeness to the Indian procedure suggests that in some cases at least couching of the lens is attempted. A very extensive list is given of the things which the patient may not do on pain of failure of his operation. A very generous margin of protection to the surgeon's reputation is thus provided against the accidents which may befall the patient after such a procedure.

R. H. E.

Kirkpatrick (H.). **Diseases of the Optic Nerve, as met with in the Government Ophthalmic Hospital, Madras.**—*Brit. Jl. Ophthalm.* 1920. June. Vol. 4. No. 6. pp. 271–275.

This is a very valuable contribution to Tropical Ophthalmology, and is an effort to tabulate the cases met with in the dark room of an Eastern hospital, with a view of contrasting what is found there with what is known under European conditions of work. The high proportion of optic nerve diseases is a very striking point, such diseases representing nearly half of all fundus cases seen in the hospital. Kirkpatrick divides his cases into four groups: (1) the actively inflammatory, (2) the post-inflammatory atrophies, (3) the primary atrophies, and (4) atrophies secondary to an inflammation of a very mild type, or to a post-neuritic inflammation. These last are far the most numerous of all. The causative factors are discussed: Consanguinity in the parents stands at the figure of 71·8 as compared with 60 as found in the general population. Pyorrhea, malaria, dysentery, quinine poisoning, venereal disease, blood changes and urinary conditions are all discussed in turn. The figures are taken from a total hospital attendance of 65,000 people.

R. H. E.

Wood (D. J.). **Accommodative Failure in Malaria and Influenza.**—*Brit. Jl. Ophthalm.* 1920. Sept. Vol. 4. No. 9. pp. 415–416.

Wood saw, in 1918 and 1919, a large number of cases of malaria from what was then German East Africa, and observed two ocular troubles in very many of them, viz., inability to stand sunlight and inability to read. "After a bad attack the tenderness of the eyes to light lasted, as a rule, for about a week, but the difficulty in reading persisted longer—a month or so—if no second attack occurred to keep it going. Neutral tint glasses and an allowance for reading of a diopter, or sometimes more, were needed in a large number of the cases, where the men were well enough to go about freely."

After the virulent influenza epidemic which visited South Africa in October 1919 had passed, he began to get numbers of cases, where patients were unable to read, though they were quite able to return to work. The difficulty continued for many weeks, and recovery was slow. Loss of hair was a frequent concurrent symptom.

The failure of the ciliary muscle in these cases seemed to be out of all proportion to the severity of the general illness, and it persisted after the patient felt quite well again.

R. H. E.

Castelain & Lafargue. **Du tétanos consécutif aux lésions oculaires.**—*Ann. d'Oculist.* 1920. Vol. 157. Jan. pp. 9–26.

The writers treated a case of tetanus after eye injury in a soldier, and in publishing the notes of their case, collected all the previous records, amounting to 23 in all. It has long been a matter of surprise to ophthalmic surgeons that in countries where tetanus is rife, India, for instance, it is so rare to find it as a sequel of eye injuries. The examination of the present records shows that in no less than 18 out of the 23 cases panophthalmitis was present. The first symptoms of tetanus appear to come on very early in eye patients; 18 out of the 23 died. In those who survived, the duration of the symptoms was about a month.

R. H. E.

McPherson (G.). **Report on the Ophthalmic Work done in the Mesopotamian Expeditionary Force during 1917 and 1918.**—*Brit. Jl. Ophthalm.* 1920. Feb. Vol. 4. No. 2. pp. 64–75.

It is only possible to mention a few points in this very interesting paper. Excisions of the eyeball were performed under local anaesthesia, which proved a great advantage as the surgeons were very short-handed. No less than 19 operations for glaucoma were performed. In the acute cases, iridectomy was selected; in the others, Elliot's trephining with good results.

There were 255 cases of artificially produced ophthalmia in the two years; the agents used were jequirity, croton, or castor oil seeds. The former were the most popular. Any of these seeds can be purchased in the bazaar of an Eastern town. The action is similar in all, but that of the jequirity seeds is the most powerful, and that of the castor oil seeds the least. A small piece of the seed pulp is placed in the lower fornix, and allowed to stop there; very rarely the irritant is applied to the upper lid as well. Sloughing of the conjunctiva in contact with the seed occurs, and there is great redness of the corresponding lid and

chemosis of the neighbouring conjunctiva. An unilateral conjunctivitis, especially if it attacks only one lid and if it is accompanied by local sloughing of the conjunctiva, should always arouse a suspicion of malingering, and lead to the patient being very carefully watched. Even the fact that there is a coincidental sore on the penis should be discounted until after observation of the case, for some of the more thorough-going malingerers produce this sore in the same way.

In connection with night blindness, McPherson says, "if one suspects a case is not genuine, one might ask the man's C.O. to put him on extra day duty. I have known of outbreaks of night blindness disappearing rapidly under such treatment."

Of special interest to tropical practitioners is his observation that he has seen six cases of eye inflammation during his two years in Mesopotamia all caused by emetin from hypodermic syringes being accidentally introduced into the eyes of nursing sisters. The symptoms came on about 10 hours after the accident. There was slight swelling of the upper lid, injection of the bulbar conjunctiva, and marked photophobia. The cornea stained to fluorescein. Recovery was complete in about 10 days under fomentations and use of atropin.

Quinine amaurosis.—McPherson saw two cases of this condition; in one, a man of 25 received 20 grs. of quinine one day, and 10 grs. the next, with very serious consequences; in the other, a man of 47 was given 20 grs. of quinine bichloride one day and 10 grs. the next. He had serious general symptoms and his vision became very dim. He improved and his fields of vision were almost normal when he was last seen.

McPherson believes that the unnecessary use of dark glasses may lead to a strain on the accommodation and to troublesome headaches, which are relieved when the glasses are discarded.

R. H. E.

HARSTON (G. Montagu). **The Blind Sorrow of China.**—*China Med. Jl.* 1920. Sept. Vol. 34. No. 5. pp. 467–475.

Harston reviews some of the peculiarities of ophthalmic practice in China. What he has to say would apply equally to most Eastern lands. He comments first on the frequency with which cases of glaucoma come too late for operation, and to the great value of the Elliot trephine operation in sufficiently early cases. He considers that prophylactic trephining has a definite rôle in oriental practice. By careful attention to the technique which has been laid down, he has been able to avoid late infection in his practice. Syphilitic neuritis and consequent optic atrophy are common in China; so also is syphilitic uveitis. He looks on glaucoma and syphilis as the two great causes of blindness in that country. Taken with gonorrhoeal ophthalmia and trachoma, the four diseases cause 90 per cent. of all blindness. He has found silvol, in 10 per cent. solution, applied hourly, of great value in the gonorrhoeal cases. He speaks of trachoma as the greatest scourge of all, and says that at all ages, "the common, wet, household towel, used by all the members of the household indiscriminately among the lower classes of China" is the usual method by which the disease is spread. In China, as in India, trachoma is a mixed infection.

Harston makes a strong plea for the establishment of travelling ophthalmic hospitals in China under a Ministry of Health. A resolution to this effect was unanimously carried at the Conference at which this paper was read.

R. H. E.

Fleming (Norman B. B.). **The Government Ophthalmic Hospital, Madras.**—*Brit. Jl. Ophthalm.* 1920. Vol. 4. pp. 555–557.

Fleming had the opportunity of visiting and working at the Government Ophthalmic Hospital, Madras, which is probably the best equipped ophthalmic hospital to be found anywhere, and which has, for many years, had a high reputation for the welcome it offers visitors. It is evident that Fleming has found that that reputation is still maintained, and those who read what he has written about this institution, will probably many of them feel tempted to make an effort to see it for themselves. What he says of its immense clinical opportunities, of its efficiency, and of its equipment, is certainly in no way exaggerated. A young ophthalmologist will probably learn more there in a month than he is likely to do at most other places in six months. Though Colonel Kirkpatrick is no longer in Madras the traditions are ably carried on by his successor.

R. H. E.

MacCallan (A. F.). **Notes on the History of Ophthalmology in Egypt.**—*Bull. Ophthalm. Soc. Egypt.* 1920. pp. 64–66.

This fascinating little paper starts with a papyrus 34 centuries old, and written by the medical priests of the XVIIIth dynasty at latest. In this document, there is evidence that the writers knew of purulent ophthalmia and trachoma, as well as of many other eye conditions, inclusive of leucomata and trichiasis. From that time on the history of ophthalmology in Egypt is sketched in a light and attractive manner, illuminated by the names of Hippocrates, Herophilus, Euclid, Heliodorus, Celsus, Paul of Aegina, and others.

R. H. E.

MALARIA.

IYENGAR (M. O. Tirunarayana). **Preliminary Report of a Malaria Survey of Calcutta and Environs.**—*Ind. Jl. Med. Res.* (Special Indian Science Congress Number, 1920.) pp. 8–17.

Although still incomplete this survey affords valuable indications of the risk of malaria to which Calcutta is becoming subject and of the means by which it can be combated. The freedom from malaria of central Calcutta, as contrasted with its prevalence in the suburbs, had long been familiar. This survey has, however, shown that *Anopheles stephensi* breeds freely in the cisterns which abound on the terraces of Calcutta houses for the purpose of storing the filtered and unfiltered water supplies of the city. The percentage of these tanks in which Anopheles breed varies from 12 in Amherst Street, 26 in Wood Street, 50 in Dharamtollah Street, 56 in Jamapukur Street and 62 in Clive Street. These figures show that neither at home nor at business is there any section of the community far removed from the breeding-places of these mosquitoes; while from the further facts that in an area of four-ninths of a square furlong in Dharamtollah 36 of these tanks were counted and that Calcutta covers an area of three-and-a-half by one-and-a-half miles, some idea of the magnitude of the problem is gained. Stegomyia, too, is widely spread. Just as Bombay had, in 1907–1908, an epidemic of malaria unprecedented in its history, so, it is felt, is there the risk that further importation of malaria-carriers, coupled with an increase in the anopheline factor, may produce at any time a similar epidemic in Calcutta.

The remedy is obvious, but its application difficult. Were the Calcutta water supply continuous the multiplication of storage cisterns would be unnecessary. They would cease to be built or used. The supply is intermittent because the city cannot or will not meet the expense of a continuous one. So long as the intermittent supply continues it is recommended that cisterns should be properly screened and inspected. But the difficulties of thus treating private houses, although not mentioned by the writer, will be clear to all with experience of India and, it may be added, can hardly be overcome until popular sanitary knowledge is greater and the popular sanitary conscience less modest than is at present the case in India ; while the reckless waste of water which goes on in Calcutta renders a continuous water supply a hitherto unsolved administrative problem.

Clayton Lane.

PRATT-JOHNSON (J.). **The Distribution of Malaria in South Africa and a Mosquito Survey of Military Hospital Areas.**—*Jl. of Hyg.* 1921. Mar. Vol. 19. No. 4. pp. 344–349.

On information received from local medical men it appears that malaria is rare in Cape Province and Orange Free State ; localised in Natal and apparently capable of elimination about Durban ; prevalent in Eastern and Northern Transvaal, where it bursts out into occasional epidemics ; endemic in Swaziland ; neither endemic nor epidemic in

Basutoland ; endemic along the rivers of Bechuanaland ; endemic and liable to epidemic outbursts in Rhodesia and in the Belgian Congo. Except at Roberts Height malaria-transmitting mosquitoes have not been found in the military hospital areas in South Africa.

C. L.

Mendelson (R. W.). **Malarial Fevers.**—*Milit. Surgeon.* 1921. May. Vol. 48. No. 5. pp. 581–583.

Although laymen, and indeed many medical men, still maintain that "In Bangkok we have no paludism, only up-country do you find it," a series of blood examinations has shown a 25 per cent. infection in Bangkok patients, many of whom are reported as having never been outside the city. Two cases of cerebral malaria are quoted in one of which the parasite, although looked for during life, was only found after death. C. L.

Hoskin (Jenner). **Five Hundred Cases of Malaria in Pensioners.**—*Brit. Med. Jl.* 1921. Apr. 2. pp. 493–494.

The results of the examination of 500 malarial pensioners from Salonica, Egypt and Palestine, and East Africa, lead to a consideration of the general elements which induced malarial infection in these three theatres of war. It is shown that the infestation figures coincide with years of mobility and they are explained by concluding that in stationary camps antimalarial measures can usually be effectively instituted, whereas for an army on the march this is impracticable.

C. L.

Nicholls (Lucius). **Malaria and the Lost Cities of Ceylon.**—*Indian Med. Gaz.* 1921. Apr. Vol. 56. No. 4. pp. 121–130. With 10 Illustrations.

There is here a fascinating historic survey of Ceylon, illustrated by beautiful photographs of sculptured rocks which reveal the high state of mental culture and bodily vigour which must have characterized the descendants of those Northern Indians who invaded Ceylon in the sixth century B.C. Their subsequent degeneracy is attributed to malaria. Since the evidence is all against any change in climate or water levels, it is assumed that malaria was a new disease introduced into Ceylon by the invaders, and one which attained its later virulence by the aid of the immense irrigation works which were inaugurated at that time. Since it is estimated that to rid Ceylon of malaria would cost Rs.10,000,000 annually, and since this is an impossible financial burden, it is concluded that it is necessary to accept the alternative of waiting until more is known regarding the factors which in the balance of nature work against the mosquito, and which, when known, can doubtless be swayed for the reduction of the pest. C. L.

Clayton (Harry J.). **A Case of Malaria Infected in the Riverina, New South Wales.** (Pathological Investigation by Leslie Utz.)—*Med. Jl. Australia.* 1921. May 7. No. 19. pp. 382–384. With 3 charts in text.

The writers consider this to be the first case of autochthonous malaria reported in Australia south of Sydney, north of which place the patient had never travelled. As is usual in such circumstances the case was

very puzzling. As fever proceeded, her condition became most grave, with rigors, vomiting, coma vigil and dilated heart, but the lungs fortunately remained clear. After a process of diagnostic elimination the blood was examined and a heavy tertian infection discovered. Inquiry showed that there was swampy ground in her neighbourhood and that there had recently come to live near her house a man and his wife who had contracted malaria in the " Islands " and with whom she was friendly. Quinine had at first, on account of hyperemesis, to be given intravenously and rectally; later, administration was oral, with novarsenobillon intramuscularly. An addendum shows that certainly one, possibly two, other autochthonous cases have been observed in these regions; while an editorial deals with a case admitted to the Sydney hospital in 1915, in a man who had never been outside New South Wales, and urges the importance of an anopheline survey of the Commonwealth, and of the determination of the mosquito which acts as larval host for the malarial parasite in Australia.

C. L.

Dopter. **Le Paludisme autochtone en France.**—*Ann. d' Hyg. Publique et Méd. Legale.* 1921. Mar. 4 Ser. Vol. 35. pp. 161–180.

In pre-war days malaria had nearly disappeared from France. The Great War proved no exception to the rule that malaria accompanies armies. The subject is dealt with in three sections. (*a*) Autochthonous malaria in the fighting zone. This first appeared in September, 1915, in Savoy, introduced by African troops into a region where *Anopheles maculipennis* flourished. It next appeared in Flanders, where it had been a scourge in the time of Louis XIV, and had indeed survived ever since in certain restricted localities. The Yser inundation gave it a fresh start and its presence was confirmed in that year in 22 French, 93 British, and in some Belgian troops. Another indigenous focus was similarly lighted up on the banks of the sluggish Seille, in 1915, and spread towards Pont-à-Mousson, in the Woevre and about Commercy. In 1917, inundations by the Germans gave rise to a focus about Noyon, where malaria had never been known. Another entirely new focus appeared about Berry-au-Bac, and yet another in Haulzy wood, between Champagne and the Argonne near the confluence of the Aisne and Tourbe. This furnished a number of cases. Others were reported from Verdun, Avocourt, Valelaincourt and Ancemont. The marshy environs of Troyes, free from autochthonous malaria since 1897, provided some cases. A new focus appeared in Southern Alsace. In 1918 a considerable focus appeared in Retortat, near Sezanne. The total cases to be reported from the military zone were 298. (*b*) Autochthonous malaria outside the fighting zone was noted sporadically at Vannes and Rennes; endemically at Beauce, in the Var and near Montpellier; and as a recrudescence in Brittany. During 1918 there were 198 autochthonous cases collected from these parts. (*c*) Post-war cases have occurred even in Paris.

A. maculipennis and *A. bifurcatus* appear to be the carriers in France, and June the most favourable month for transmission. The writer follows the common French practice of omitting a list of the literature to which he refers.

C. L.

Lanzenberg (A.). **Un cas de paludisme autochtone à** *Plasmodium praecox.*—*Bull. Soc. Path. Exot.* 1921. May 11. Vol. 14. No. 5. pp. 266–268.

Paisseau (G.) & Loubrieu. **Paludisme autochtone à** *Plasmodium praecox.*—*Ibid.* pp. 268–273.

These papers add two to the number of autochthonous cases of subtertian malaria arising in France. Diagnosis rested on the detection of the parasite in the blood. The first was markedly anaemic with red corpuscles only numbering 2,700,000 per c.mm. and with the skin yellowish, suggesting cancer of the stomach. He improved greatly under quinine and was apparently cured, though subsequent information showed that he died later of a pernicious attack.

The second was another of those interesting cases in which the intravenous injection of novarsenobenzol lights up a latent malaria. The infection had evidently been acquired six months earlier and was now detected for the first time by the microscope. Disinfestation was only obtained with difficulty by intense cinchonization over a fortnight, followed by six intravenous injections of quinine and novarsenobenzol on alternate days. The writers comment upon the association, already noted, between syphilis and autochthonous subtertian malaria in France, six out of the thirteen cases having the double infection, and give a survey and welcome bibliography of these cases.

In a discussion which followed Roubaud added two further autochthonous cases of *P. praecox* [*falciparum*] infestation, one in a medical man, director of the Civil Hospital at Dieppe, and the other in a child.

C. L.

Tixier (L.) & Bidot (Ch.). **Un cas de paludisme autochtone chez un nourrisson de 4 mois.**—*La Pédiatrie prat.* 1920. Apr. 5. No. 1. [Summarized in *Gaz. des Hôpit.* 1921. June 21 and 23. Vol. 94. No. 49. p. 775.]

In a child under three years old, born in Paris and since living in the vicinity of the Military College, where carriers of the malarial parasite cannot be exceptional, there appeared fever on alternate days with restlessness, sweating, vomiting, blackish diarrhœa and great thirst. A month later the blood was examined and tertian parasites found. Treatment was with intramuscular injections of formate of quinine, the dose being 0·05 gm. Cure followed.

C. L.

Fendel (H.). **Ueber zwei eigentümliche Fälle von Febris intermittens.** [Two Peculiar Cases of Intermittent Fever.]—*Muench. Med. Woch.* 1921. June 24. Vol. 68. No. 25. p. 771.

In two cases of quotidian fever occurring at Höchst-on-Main, which had never been in any region recognised as malarial, there occurred quotidian fever with rigors, sweating, enlarged spleen and anaemia: No parasites were found in the blood. Both cases were cured after taking quinine.

C. L.

GENOESE (G.). **Esantema scarlattiniforme da malaria.** [Scarlatiniform Exanthem in Malaria.]—*Policlinico.* Sez. Prat. 1920. Aug. 9. Vol. 27. No. 32. pp. 858–859.

Various rashes simulating measles, erythema nodosum, urticaria, purpura, pemphigus, etc., have been described as occurring in the course of malaria. Such observations include some among children, though these are less numerous than descriptions of adult malarial exanthems, and are barely alluded to in the text-books of pediatrics. The writer describes a scarlatiniform rash which he observed in a child of six who was infected with malaria, as were also his parents and an elder brother.

When seen the child had been suffering from typical attacks of ague every two days for the last eight days. The rash was exactly like that seen in scarlet fever (minute punctiform type) and became intensely vivid during the fever. The distribution on the face was about the nose, mouth and chin. On the trunk it covered the whole of the back and was fairly obvious on the upper part of the thorax, fading as it descended to the abdomen. There was no rash on the thighs. A similar rash, though not so widely distributed, had been observed by the parents a week before the onset of fever. There was no sore throat, though slight desquamation was noted where the rash had been most intense. Its disappearance was not gradual, as in scarlet fever, but followed immediately the fall of the temperature. Cure was effected by three injections (0·50 gm.) of quinine.

Other cases of malarial scarlatiniform rash are to be found in the literature, from MORTON (1696), who describes a patient during the attack of fever with "*cutis rubedine intensa ubique perfundebatur,*" to TARASCONI, who has described a somewhat similar rash in a patient aged 31 (*Policlinico.* Sez. Prat. 1909). [See also CHALMERS & INNES: this *Bulletin,* Vol. 11, p. 398.]

J. Rosslyn Earp.

RUSCA (Carlo Lamberto). **Per la casistica clinica della malaria: perniciosa con meningismo ed iposurrenalismo.** [Pernicious Malaria with Meningism and Hypoadrenalism.]—*Policlinico.* Sez. Med. 1920. July. Vol. 27. No. 7. pp. 256–272.

The writer describes a case which caused some difficulty in diagnosis.

S. E., a soldier, was admitted in the evening of September 6th, 1917, as an urgent case. The patient himself was semi-comatose, but the history accompanying him showed that hyperpyrexia had lasted three days. The patient had vomited the previous day. Since the beginning of the illness the bowels had been irregular. His health while in the regiment had been good until the present illness. The patient replied to repeated questions with slow staccato (not scanning) speech. Skin was bronzed, visible mucosa pale but not pigmented. Small, hard, mobile, painless glands were palpable in the neck and groins. The temperature was 103° F., the pulse 96, fine, regular, weak. The blood pressure could not be recorded. There was slight jaundice of the sclerotics, the tongue was furred, the breath foetid. Respirations thirty to the minute, signs of slight pulmonary emphysema. Examination of the abdomen showed meteorism, the spleen and liver palpable. Except for a brisk plantar response the reflexes were normal. There was no dermographism. The urine contained traces of albumin and urobilin, hyaline and granular casts. The patient was put on light diet and treated by purgation and a stimulant injection. For the next three days the temperature varied between 100° F. and 103° F. The patient remained lethargic, Kernig's sign and headache appeared, vomiting continued. Spinal puncture was negative. The reaction of the pupils became sluggish. On the 10th the temperature rose to 103·5° F.

This was preceded by a slight rigor and followed by profuse perspiration. The following day a blood examination was made and some crescents and some small amoeboid forms were found. Quinine was administered (1 gm. intramuscularly). Next day the temperature fell below normal without amelioration of symptoms. The pulse was 120 and, in spite of the two injections of 1 mgm. each of adrenalin, remained weak. The patient, however, recovered sufficiently from his somnolence to give a personal history. This included the information that he had suffered at the age of thirty for about a year from malaria, which had always been tertian. Treatment with quinine and adrenalin was continued. On September 14th marked improvement was observed, and on September 19th the patient, whose improvement had been maintained under daily treatment with quinine, was removed to another hospital. His death was reported on September 23rd, with the note that the last three days had been remarkable for a progressive and extreme asthenia. At the autopsy the spleen was found enlarged and with a sub-acute tumour " probably malarial." There was hyperaemia of the meninges and oedema of the brain and ventricles. Both suprarenals were enlarged and caseous. No other signs of tuberculosis were found (unless an adherent pleura be so considered), nor was there any bronzing of the skin or mucous membrane. The tuberculous process in the suprarenals was " primary and evidently chronic." There was also acute parenchymatous nephritis.

The writer discusses the symptoms in this case at great length. He draws the moral that the symptoms of malaria may completely mask those of suprarenal insufficiency, while this insufficiency may suddenly become acutely serious through the added strain of malarial infection. In cases of pernicious anaemia with symptoms suggesting co-existence of adrenalin want, the possibility of a pre-existing and coincident tuberculosis of the suprarenals should not be forgotten.

J. Rosslyn Earp.

Craig (Charles F.). **The Classification and Differential Diagnosis of the Aestivo-Autumnal Malaria Plasmodia.**— *Amer. Jl. Trop. Med.* 1921. Mar. Vol. 1. No. 2. pp. 57–95. With 6 charts and 3 plates.

After pointing out that in infections produced by the direct inoculation of malarial blood the clinical features of, and the type of parasite found in, the new infection are invariably those of the form inoculated, and that throughout more than 100 mosquito experiments recorded in literature the same sequence has followed, Craig urges that proof of the plurality of species is practically incontrovertible, the three species being *Plasmodium malariae* Marchiafava and Celli, 1885; *P. vivax* Grassi and Feletti, 1890; and *P. falciparum* Welch, 1897. He urges that subdivision should go further, and that in the case of aestivo-autumnal malaria there are two forms with at least subspecific rank, *P. falciparum*, Welch, 1897, and *P. falciparum quotidianum*, Craig, 1909, differing from one another (as do *P. vivax* and *P. malariae*) chiefly in the size and number of the sporozoits and the periodicity of sporulation.

In *P. falciparum* the earliest form noted is a hyaline motile ring or disc 2–3 μ in diameter, the rings differing from those of *P. vivax* in being broader at one part—having, that is, the signet-ring shape. Infection in a corpuscle is usually single, rarely more than double. In about eighteen hours the rings reach 3·5 μ and some pigment appears, generally in the thickened part of the ring. The ring shape is then lost, the parasite growing until it fills from two-thirds to three-quarters

of the erythrocyte. Pigment then collects in the centre and 10–30 (usually 18–24) merozoits appear. The erythrocyte is usually smaller, never larger, than the normal, and is of a slightly darker green colour than is usual.

In *P falciparum quotidianum* the earliest rings measure 0·5 μ, are motile, and are then apt to lose the ring shape. In two to four hours the rings have increased to a diameter of 1 μ, do not have the signet shape and are unpigmented ; double and triple infections of a single erythrocyte frequently occur, and even five or six rings may be observed in one corpuscle. The ring form is then lost and pigment appears, the parasite filling one-fifth of the erythrocyte. Its maximum growth reaches one-third or one-half of the diameter of the erythrocyte, which is shrunken, crenated and of a dark green olive colour. Twenty-four hours after infection of the erythrocyte the parasite gives rise to 6–18 (usually 12–14) merozoits, only 0·5 μ in diameter. Gametes are smaller by at least one-third, and plumper, than those of *P. falciparum*, both macrogametes and microgametes being kidney-bean-shaped rather than crescentic.

P. falciparum typically produces a fever which rises rapidly to 102° or 103° F., oscillates for several hours over about 1°, falls in a pseudo-crisis of 1·5° to 3°, rises often to a greater height than ever, and then falls rapidly to normal, the febrile period being 38 to 40 or more hours.

P. falciparum quotidianum typically produces an abrupt daily rise to 103° or more, followed after 8 to 10 hours by an abrupt fall to normal.

Atypical paroxysms are common in both cases.

Temperature charts, excellent when one has grasped that they represent not morning and evening, but three-hourly, temperatures, and very pleasing microphotographs, greatly strengthen the writer's contentions.

C. L.

Bass (C. C.). **An Attempt to explain the Greater Pathogenicity of *Plasmodium falciparum* as compared with Other Species.**— *Amer. Jl. Trop. Med.* 1921. Jan. Vol. 1. No. 1. pp. 29–33.

Bass (see this *Bulletin*, Vol. 17, p. 139) finds that when cultures of *P. falciparum* 36–40 hours old are placed under a cover on a slide and the cover is pressed by a delicate instrument the non-infected erythrocytes move freely back and forth, while those infected are motionless. He explains this on the supposition that the non-amoebic parasite is so firm and its size so considerable that it lifts the cover off the other erythrocytes. " The other species of parasite do not show this apparent firmer consistency." [Presumably it is intended to suggest that although appearing larger when the erythrocyte is seen from the side, these other species are flat and do not bulge it, whereas *P. falciparum* does so.] If this firmer consistence exist it will, it is presumed, check infected erythrocytes in the capillaries, infection of adjacent erythrocytes will occur and the capillaries become completely blocked.

C. L.

Broughton-Alcock (W.). **Laboratory Observations on Latent Malaria in Soldiers returned to England, their Relation to Clinical Observations and the Value of the Large Mononuclear Cell Count. The Test for Quinine in Urine.**—*Jl. Trop. Med. & Hyg.* 1921. May 16. Vol. 24. No. 10. pp. 133–137.

This paper tabulates the results of blood examinations on 18,270 military pensioners who had served in places where malaria is endemic. Of these 777 were found infected, 759 with *Plasmodium vivax*, 14 with *P. falciparum* and 4 with *P. malariae*. The kind of film found most advantageous was a regularly-bordered thin one, evenly spread by means of a second slide or coverslip, and reaching neither the edges nor ends of the slide. Ear blood was discarded in favour of finger blood on the ground that the former contains in its first drop an " erroneous increased percentage figure in the number of the large mononuclear leucocyte." Taking 15 per cent. of large mononuclears as the upper limit of a normal blood, the writer's experience is that figures above this limit cease to be found within a few days of the institution of quinine treatment and that an excess over this limit is not a constant feature in latent malaria. Testing for quinine in the urine proved an efficient check on malingering.

C. L.

Esquier (A.). **La formule hémo-leucocytaire dans le paludisme dakarois.**—*Arch. Méd. et Pharm. Nav.* 1921. May–June. Vol. 111. No. 3. pp. 227–229.

In 25 young marines infected with *Plasmodium praecox* [*falciparum*] blood counts of 500 leucocytes gave percentages of polynuclears amounting to 80 in seven, 75–80 in seven, 70–75 in six, 64–70 in five ; while large and median-sized mononuclears varied apparently from 6–19·4 per cent.

C. L.

Ziemann (Hans). **Ueber wichtigere Probleme der modernen Malariaforschung.** [Important Problems of Modern Malaria Researches]. —*Berlin Klin. Woch.* 1920. July 12 and 19. pp. 659–663 and 687–690.

The most interesting problem dealt with in this paper is that of resistance to quinine. It is considered from two aspects (1) Can the human body become so used to quinine that the action of the drug becomes imperfect ? (2) Do the parasites become resistant to quinine ? Under the first, the question of malnutrition in its bearing on quinine treatment is mentioned, and under the second the author uses the term resistance to quinine as synonymous with virulence. If such resistance develop it will, he urges, be transmitted through the mosquito to the next generation ; in which connection it is well to consider the work of the brothers Sergent (see below).

He next passes on to the consideration of the establishment of quinine-resistant races of malarial parasites. He quotes Bauer as saying that in cases treated with quinine, strains of parasites are established which are so resistant ; and his own previous statements that the virulence of parasites and the amount of quinine required to destroy them must vary with the " genius loci."

On such lines he divides parasites into A-parasites, an avirulent strain; V-parasites, a virulent strain; and A-V-parasites or bastard strains. The V-parasites he explains as having no quinine receptors or so many that they do not act. He assumes, that is, that quinine cures by combining with the parasites. There is further ingenious argument on similar lines, but it would have been wiser to have obtained proof that such combination occurs before proceeding to the elaboration of the theory.

C. L.

(i) Sergent (Etienne and Edmond). **Étude expérimentale du paludisme. Paludisme des oiseaux** (*Plasmodium relictum*). **I. Efficacité de la quininisation préventive. II. Moment où elle doit commencer. III. Races de plasmodium quininisées. IV. Essais de médicaments autres que la quinine. V. Essais de vaccination.**—*Bull. Soc. Path. Exot.* 1921. Feb. 9. Vol. 14. No. 2. pp. 72–77. [Discussion p. 78.]

(ii) Sergent (Etienne and Edmond). **Étude expérimentale du paludisme. (Paludisme des oiseaux à** *Plasmodium relictum*, **transmis par** *Culex pipiens*).—*Arch. Instituts Pasteur de l'Afrique du Nord.* 1921. Mar. Vol. 1. No. 1. pp. 1–32. With 1 text-fig.

(i) These writers here continue the work already reported (this *Bulletin*, Vol. 17, pp. 307–308). If blood containing *Plasmodium relictum* be injected into uninfested canaries, and daily injections of quinine be begun simultaneously, there supervenes a latent malaria, symptoms being absent so long as quininization continues; nor does reinoculation during the course of the treatment produce any exacerbation. This effect is attributed not to the quinine but to the relative immunity, which other experiments have shown to be conferred under these circumstances, acquaintance with which is assumed. From the results of twelve experiments under varying conditions it is concluded that to administer prophylactic quinine before there is risk of infection is useless.

In one case only was there evidence of the development of a strain resistant to quinine, this character being retained in full during its passage through two other canaries, and, in lessened degree, through a third. It appeared in a canary kept quininized for nine months without symptoms, these then appearing in spite of the continuation of the quinine. In most cases quinine attenuated the virulence, since, after inoculation of blood from such cases, the illness produced was mild and only attained normal virulence after passage through one or two birds, or even three in a case in which one of the inoculations had been effected through the intervention of Culex.

Of drugs other than quinine *Marrubium vulgare*, salicin, colloid sulphur, emetine, arsenobenzol and cinnamon proved less satisfactory than quinine.

In the course of many vaccination experiments it was found that the inoculation of sporozoits, kept in vitro for 12 to 48 hours, produced immunity in 29·5 per cent. of 24 canaries; and the inoculation of blood, drawn during the incubation period after inoculation, produced similar immunity in 21·3 per cent. of 61 canaries; the normal immunity having proved to be 0·72 per cent. in 965 birds.

(ii) This paper contains the experimental details of the work bstracted above and previously, and is the one which should be consulted by other investigators.

C. L.

Bass (C. C.). **The Standard Treatment for Malaria. A Discussion of Some of its Advantages.**—*Southern Med. Jl.* 1921. Apr. Vol. 14. No. 4. pp. 280–288.

The standard treatment of malaria adopted by the United States National Malaria Committee is explained and justified by Bass in this paper. The sulphate is recommended because it is cheap, well known, and slowly absorbed, so maintaining a certain concentration in the blood for a considerable time. It is given in doses of 30 gr. daily for three or four days, that being held to be the minimum amount which will check clinical symptoms. It is recommended that it should be given in divided doses of 10 gr. three times a day since this is less trying and seems as effective as the single dose. Except for rare emergencies intravenous injection is not recommended, because it saves but a few hours, introduces definite and occasionally most grave effects, is spectacular, requires special facilities and technique, and is not available for mass treatment. Intramuscular injection is not recommended because the quinine so given is absorbed into the circulation at a variable rate, because the injection may produce necrosis, is evidence of a failure to realise the feelings of the patient, is spectacular and requires special facilities and technique. If the few hours' delay in getting its effect are not important, oral administration is advised as being reliable, unspectacular, and capable of the widest use.

It is recommended that for eight weeks after clinical symptoms cease 10 gr. of quinine should be taken daily, not in the belief that this dose will sterilise all cases, but as an admittedly arbitrary means between this wished-for condition and an entirely inadequate course of treatment which will leave behind many carriers. The treatment advised has been found to disinfest in 90 per cent. of cases. The matter must be a rule of thumb one since by no known test can the moment of disinfestation in an individual be determined.

C. L.

Rowe (Ch.). **Komplizierte Malariafälle in Palästina.**—*Beitr. z. Klin. d. Infektionskrankh. u. Immunitätsf.* 1920. No. 4. [Summarized in *Arch. f. Schiffs- u. Trop.-Hyg.* 1921. Vol. 25. No. 3. p. 91.]

In chronic relapsing malaria no better results were obtained with 2·4 gms. than with 1 to 1·5 of quinine. Erythrocytes were not more affected in vitro by quinine solution in those who taken quinine or had had malaria for long. Sterilization is held to be partly the result of the formation of antibodies. In a case of malarial haemoglobinuria the kidneys were held to be the site of the haemolysis. The resistance of erythrocytes to quinine solution is not altered in blackwater fever. If malarial relapse and typhus co-exist, a further relapse will occur four weeks later.

C. L.

Veras (Solon). **Malaria in Children at Smyrna.**—*British Jl. of Children's Diseases.* 1921. Jan.-Mar. Vol. 18. Nos. 205–207. pp. 1–11.

The writer analyses 88 cases of malaria, diagnosed apparently, partly clinically, partly microscopically, in children up to ten years old. He

prefers oral administration of aristochin or euquinine in the following doses :—

0 — 6 months	.. ..	0·1 — 0·15 gms. daily
6 — 12 ,,	.. ..	0·15 — 0·3 ,,
1 — 2 years	.. ..	0·2 — 0·4 ,,
2 — 5 ,,	.. ..	0·25 — 0·5 ,,

Intravenous administration he has not tried, but he considers rectal administration very uncertain, and hypodermic injection into the deep cellular tissue as the method of election, using 0·24–0·5 gm. for each injection. With esanofele, an Italian mixture of quinine hydrochloride, arsenic and citrate of iron, he has obtained good results.

C. L.

NEUMANN (Alfredo). **Esiste la possibilità di trattare le forme sessuate della malaria tropicale ?** [Is it Possible to treat the Sexual Form of Tropical Malaria ?]—*Policlinico. Scz. Prat.* 1920. Oct. 18. Vol. 26. No. 42. p. 1177.

In the Austro-Hungarian camp at Tirana from 1916 to 1918, the writer treated carriers of tropical malaria gametes with results shown in the following table :—

Treatment during three Days.	Blood Test after Treatment.		
	Positive.	Negative-Positive.*	Negative.
Quinine hyd. by mouth 2×1·5 gm... ..	35	11	7
Quinine urethane by subcutaneous injection, 2·0 gm.	57	16	24

* First test negative, subsequent tests positive.

These large doses of quinine were followed by the usual prophylactic dose of 0·5 gm. quinine hyd. daily, and the patient was retained in hospital for at least a fortnight, during which three or four blood tests were made.

On seven occasions within an interval of 7 to 10 days, were found first a negative blood test, then a positive, and finally, after quinine treatment once more, a negative. He finds it difficult to reconcile these results with the theory supported by ZIEMANN, that quinine can only kill the young gamete in the internal organs and not the adult form in the blood stream. He concludes that the possibility that the gametes of tropical malaria are not always, and under all circumstances, quinine-resisting, is of more than theoretical interest.

J. Rosslyn Earp.

PITT (G. Newton). **The Intravenous Administration of Quinine in the Treatment of Malaria.**—*Guy's Hosp. Reps.* 1921. Jan. Vol. 71 (Vol. 1. Fourth Series). pp. 21–25.

Without stating the number of cases on which his experience is based, the writer concludes :—

" With our present experience we may hold that the intravenous method is free from danger. It is far superior to the intramuscular and subcutaneous methods, and is to be advised in all serious cases where there

are cerebral symptoms or hyperpyrexia. It is valuable in obstinate relapsing cases, and it has proved of value in some cases of blackwater fever when there has been a fair secretion of urine. The usual dose is 12 grains of bihydrochloride of quinine in 12 cc. of saline solution, and it may in urgent cases be given three or four times in the twenty-four hours."

C. L.

DE BLASI (Alberto). **Il chinino e il bleu di metilene nella malaria.** [Quinine and Methylene Blue in Malaria.]—*Policlinico.* Sez. Prat. 1920. Oct. 18. Vol. 27. No. 42. pp. 1177–1178.

The writer refers to REITLER's observation [this *Bulletin*, Vol. 15, p. 415], that methylene blue, by itself ineffective, reinforces the action of quinine in malaria. He himself published conclusions on the use of methylene blue as early as 1902 (*Gaz. degli Osped. e del. Clin.* No. 30). In this and in other publications cited, he has shown the efficacy of methylene blue used in conjunction with quinine, and has insisted on the necessity of using reliable pharmaceutical material. The difficulty in obtaining this is now greater than ever. He recommends the following pill :—

Quinine hydrochloride	.. .. ..	cgm. 20
Citrate of Iron	,,	2
Cacodylate of Iron	,,	2
Medicinal methylene blue	,,	5
Extract of quassia, gentian, eucalyptus, q.s.		

Three or four pills to be taken at intervals of two hours during the forenoon.

MUSSÉOS has claimed that the ictero-haemoglobinuria of cinchonism may be distinguished from that of malaria by the administration of methylene blue, which will cut it short if due to malaria. The writer considers this test unreliable.

J. Rosslyn Earp.

KING (W. V.). **Natural Malaria Infection in Anopheles Mosquitoes.**—*Amer. Jl. Trop. Méd.* 1921. Jan. Vol. 1. No. 1. pp. 35-39.

Of 5,673 *Anopheles maculipennis*, collected from negro tenant houses on a plantation typical of the Mississippi delta and from buildings occupied by negro convicts on the State penitentiary farm in Sunflower county, Mississippi, and dissected, the rates of infestation of stomach and salivary glands were 0·57 and 0·03 respectively. Great variations occurred in different seasons and at the different places, while parasite and spleen rates were equally variable.

C. L.

WESENBERG-LUND (C.). **Contributions to the Biology of the Danish Culicidae.**—*Mém. Acad. R. Sciences et Lettres Danemark.* (Sect. des Sci.). 1920–1921. 8th Ser. Vol. 7. No. 1. pp. 1–210. With 21 plates and 19 text figs.

The most interesting part of this communication lies in its bearing on ROUBAUD's view upon the effect which animal houses have in guarding man from the attacks of *Anopheles maculipennis* and from the risk of malaria. The line of argument runs thus :—*Anopheles plumbeus, A. bifurcatus* and *A. maculipennis* are the species of this genus inhabiting Denmark. The last is the recognised species carrying European malaria, but in Denmark the writer has never found it wild. It hangs lethargic

and bloated from the ceilings of pigsties, cowsheds and stables, which it does not leave except for the purposes of mating and egg-laying. It can hardly be induced to bite man. These facts are in marked contrast to its vigour and voracity for human blood in Italy. Nevertheless, about a hundred years ago, appalling epidemics, attributed to malaria, occurred in Denmark. It is pointed out that it is during this same last hundred years that domestic animals in that country, instead of living in the open all or part of the year, have become consistent house dwellers; and it is suggested that malaria has disappeared from Denmark because there has arisen there, and perhaps there only, a stock of *A. maculipennis* with a marked preference for the blood of animals. It appears that with this change has gone an increase in size, since its present dimensions are not those which occur in the descriptions of 120 years ago, at which time the mosquito was, presumably, a man-feeder.

C. L.

Federated Malay States. **Malaria Bureau Reports.** 1920. Nov. Vol. 2. By Hacker (H. P.), M.D., B.Sc. (Lond.), Medical Entomologist, F.M.S., 47 pp. With 1 folding plan, 1 map, 1 chart, and 1 text-fig. 1921. London, Dunstable and Watford: Printed by Waterlow and Sons, Limited.

In the matter of nomenclature (for reasons shown*), *Anopheles rossi* variety *indefinitus* Ludlow, lapses as a synonym of *Anopheles vagus* Donitz, 1902; *A. rossi* Giles as one of *A. subpictus* Grassi, which has a new variety *malayensis*; *A. hunteri* Strickland as one of *A. separatus* Leicester; and *A. sinensis* Wiedemann as one of *A. hyrcanus* Pallas.

Since the method heretofore employed to classify breeding-places of Anophelines has depended on a personal enumeration of variable and varying characters, and since the classification of such descriptions has proved almost impossible in the past, it is now proposed that their classification shall be made by an enumeration of the various species which are found associated with any particular form. An examination of nearly 6,000 specimens indicated that only three species, namely *A. barbirostris*, *A. kochi*, and *A. vagus* bred alone. Each of these was—most unhappily—termed the type species of the corresponding group, the three groups comprising respectively (1) *A. barbirostris*, *A. hyrcanus*, *A. fuliginosus*, *A. aconitus* and *A. subpictus* var. *malayensis*; (2) *A. kochi*, *A. tesselatus*; (3) *A. vagus*, *A. maculatus*.

When, however, the number of specimens had increased to nearly 40,000 it was found that a species found alone does not bear the importance previously attached to it. Three pairs of species were, however, found in close association, each being the commonest associate of the other. These pairs were: *A. kochi* and *A. vagus*; *A. barbirostris* and *A. hyrcanus*; *A. aitkeni* and *A. leucosphyrus*. Thus when *A. kochi* was found, *A. vagus* was also found in 17·1 per cent. of cases; and when *A. vagus* was found, *A. kochi* was associated with it in 11·4 per cent. of cases. One is bound to add that in this case *A. hyrcanus* makes close running with percentages of 14·3 and 10·3 respectively; so that it cannot be considered unlikely that the second conclusion regarding association may also require modification. This possibility

* Inadequate according to Alcock in the case of *A. rossi* and *sinensis* [see this *Bulletin*, Vol. 17, p. 113].—Ed.

does not, however, alter the fact that classification by association eliminates personal impressions, enables past figures to be epitomised, and, when numbers are accumulated in sufficient quantities, should, when one species has been found, enable an opinion to be formed as to what others are also likely to be present ; and, should this opinion prove wrong suggest an investigation into the reason for this deviation from the normal.

Further observations seem to suggest that " Anophelines wait until artificial receptacles of water have approximated to natural conditions before they use them as breeding places."

A second report deals with a local epidemic of malaria on the bank of the Perak River, attributing it to the action of drought in allowing greater salinity of the water and the consequent development of *A. ludlowi*, the epidemic ceasing with the rains and the presumedly lessened salinity of the water. [This strikes one as a sad deterioration from the days in which, as Kipling tells, Pau Amma the crab overwhelmed this river with his tides.]

The report ends with an investigation into the relationship of mangroves to malaria. None was found, the matter being probably a question of salinity; malaria, however, scoring the first round by putting the investigators to flight before they could put the matter to the test.

C. L.

Ingram (A.). **A Case of Spontaneous Rupture of the Spleen in a West African, with references to Recent Literature bearing upon Rupture of the Spleen, and Some Comments thereon.**—*Jl. Trop. Med. & Hyg.* 1921. June 15. Vol. 24. No. 12. pp. 164–167.

Based on the case of a Krooboy, aged 12, who died in his sleep from ruptured spleen without history or evidence of violence. The rarity of such cases reported in negroes, as compared with Asiatics, is considered ; and the experience of the writer and of Daniels is mentioned as showing that the former rarely exhibit the enlarged spleens so common in the latter. This condition is explained on the ground that a constant infection during childhood occurs in negroes which produces a relative immunity to the strain of the malarial parasite concerned, although it is not explained how this can be supposed to act more effectively in the negro than in the Indian. The observation of Perry, that in certain hill tracts in the Madras Presidency aborigines exhibit considerable infection in the peripheral blood without symptoms, whereas similarly-infected immigrants were severely affected, is cited, but it is not stated whether in the writer's experience similar tolerance, as opposed to immunity, exists in West Africa. The 36 references cited are mainly to English literature.

C. L.

Greval (S. D. S.). **Observations on Malaria. Part II.**—*Indian Med. Gaz.* 1921. Mar. Vol. 56. No. 3. pp. 85–89.

The conclusion of this paper is that in the febrile and non-febrile cases examined the incidence of [enlarged] spleen was higher in non-malarial than in malarial cases [it being assumed that where no malarial parasites were discovered none were or had been present.]

C. L.

(i) Furutama (T.). **A Case of Intestinal Hemorrhage coming from Malarial Fever.**—*Taiwan Igakkai Zasshi* (*Jl. of the Med. Assoc. of Formosa*). 1921. Jan. 31. No. 214. English summary p. 6.

(ii) Maruyama (Y.). **On the Recurrence of Malarial Fever connected with Typhoid Fever.**—*Taiwan Igakkai Zasshi* (*Jl. of the Med. Assoc. of Formosa*). 1921. Jan. 31. No. 214. English summary, p. 6.

The official English summaries of these papers are as follows :—

(i) "Intestinal hemorrhage accompanying malarial fever, though mentioned in foreign reports, seems to have never been reported here in Formosa. The author now gives a detailed report on a patient whom he had under actual treatment, a young man of 20, Japanese born, who was first attacked by malignant malaria accompanied by jaundice and hemorrhage of the skin and mucous membranes, as well as a comparatively severe hemorrhage in the intestines."

(ii) "An occasional relapse of malarial fever after prophylactic inoculation against typhoid fever has been recorded by some investigators. The author had under his care four patients with a relapse of malarial fever while suffering from typhoid fever. According to his observations the question whether the typhoid toxin has any particular influence upon the relapse of malarial fever is to be answered in the negative, the relapse apparently being caused by the general decline in health."

C. L.

Johnson (J. Pratt). **The Diagnosis of Syphilis in Malarial Subjects by Wassermann Reaction.**—*Jl. Path. & Bact.* 1921. Apr. Vol. 24. No. 2. pp. 145–149.

In 74 cases of microscopically diagnosed malaria under quinine treatment there were seven positive Wassermann reactions which are assumed to indicate latent syphilis. Furthermore each case was tested about ten times in each of four laboratories, each laboratory using a different technique, namely, the original Wassermann method, Tschernogobouw's method, Flemming s method, and the Hecht-Fleming Method, and the percentages giving one or more positive tests were respectively 22, 6, 27, and 27, retesting giving positive percentages of 7, 6, 7, and 11 respectively. [It would seem that, at least in malarial cases, there is, under certain conditions, room for a possibly cynical scepticism when a positive Wassermann reaction is reported.]

C. L.

Iyengar (K. R. K.). **Studies in the Value of the Wassermann Test. No. III.—Significance and Value of a Positive Wassermann Reaction in Malaria.**—*Indian Jl. Med. Res.* 1920. July. Vol. 8 No. 1. pp. 136–139.

Of 98 cases of microscopically diagnosed malaria the Wassermann reaction was positive in seven, all of which showed definite evidence of having had syphilis. Of these seven cases six had febrile attacks and were treated, receiving in two weeks 350 grains of quinine. Since their reactions remained unchanged it is concluded that neither quinine nor malaria affects this test.

C. L.

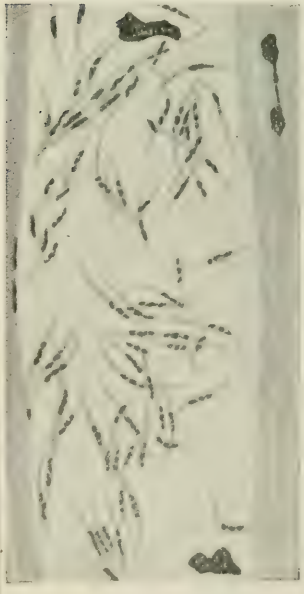
Mayer (M.). **Wanderung der Malariasichelkeime in den Stechmücken und die Möglichkeit der Ueberwinterung in diesen.** [Wandering of Malaria Sporozoites in the Mosquito and the Possibility of their Persistence through the Winter.]—*Med. Klin.* 1920. No. 50. [Summarised in *Arch. f. Schiffs-u. Trop.-Hyg.* 1921. Vol. 25. No. 2. pp. 64–65.]

In the autumn of 1919 Mayer infected a lot of Culex with the Proteosoma parasite to investigate the possibility of the infection persisting in the salivary glands through the winter. In a series of insects killed during the fifth week after the infective feed sporozoites were found in the salivary glands in great abundance, and also in all the muscles of the thorax, legs, and head, and whole bundles of them in the palpi. In a second series examined during the forty-eighth to fifty-second days after the infective feed, isolated sporozoites were found in the muscles and degenerated sporozoites in the salivary glands : no sporozoites were found in the ovaries.

A. Alcock.

Mühlens (P.). **Beobachtungen ueber das Verhalten der Malariaparasiten in der Anophelesmücke.** [The Behaviour of Malarial Parasites in Anopheles.]—*Arch. f. Schiffs-u. Trop.-Hyg.* 1921. Vol. 25. No. 2. pp. 58–61. With 5 text figs.

Impressed by Mayer's observations upon the invasion of sporozoites into the muscles of Culex infected with Proteosoma and by the possibility of the persistence of infection through winter in this way, the



ig. 1. Sporozoites in a muscle space. (× 1500.)

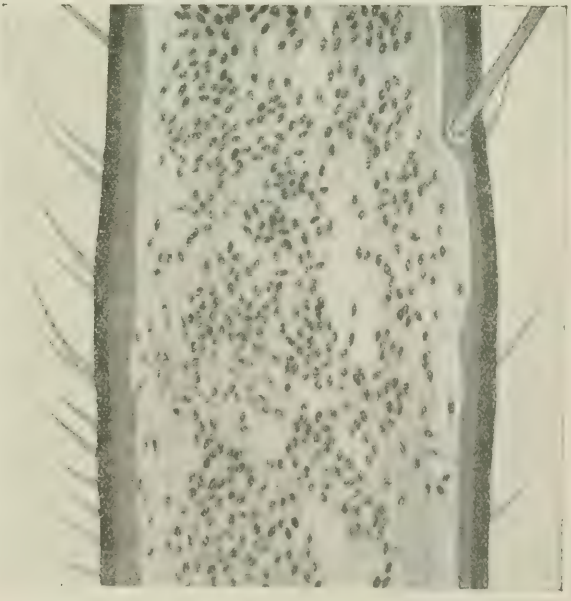


Fig. 4. Sporozoites in a palpus. (× 1500.)

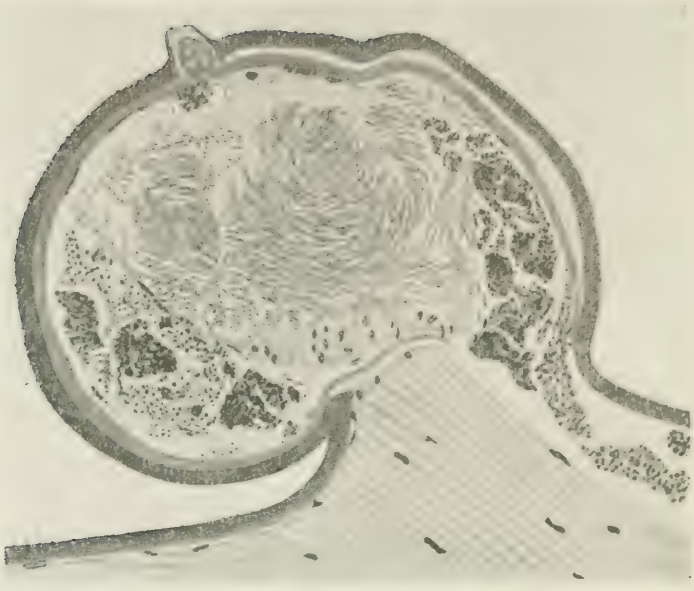


Fig. 5. Sporozoites in the Scutellum. (× 750.)
[Reproduced from the *Archiv für Schiffs- und Tropen-Hygiene.*]

author, on the 13th October, fed a batch of Anopheles on a case of benign tertian malaria, keeping the insects afterwards in a moist atmosphere at 23–25° C. Between the 3rd and the 5th November the insects were killed and sectioned.

Of eight Anopheles so treated six were found to be infected. No sporocysts were observed in the stomach wall in any case. In two of the insects the infection was so overwhelming that the author likens it to a septicaemia: sporozoites in great abundance were observed in the muscles of the thorax, legs, neck, and head; in the interstices, and beneath the epidermis, of the abdomen; in the heart and aorta; in the fatbody and in the vicinity of the ovaries—but not in the ovary itself; in the salivary glands, in a palpus, in the proboscis, and in a mass in the scutellum.

The author refers to the opinion of Grassi—who found sporozoites in the epithelium of the "foregut"—that the sporozoites accumulate in the salivary glands soon after their escape from the sporocyst, an opinion which is contradicted by these observations. He concludes that the possibility of sporozoites persisting over winter in the muscles, palpi, and scutellum is a question that requires further investigation.

A. A.

Neukirch (P.). Zur Kenntnis der Malaria der Kriegsteilnehmer. [Study of Malaria among War Personnel].—*Mediz. Klinik.* 1921. Apr. 19. Vol. 17. No. 15. pp. 452–253.

It is difficult to accept with enthusiasm a list of malarial complications and sequelae when one realises that malarial parasites were recognised in but three out of 107 of one set of the cases here dealt with.

C. L.

HELMINTHIASIS.*

STEWART (F. H.). **The Incidence of Worm Infection in Indian Troops of the Egyptian Expeditionary Force.**—*Brit. Med. Jl.* 1920. Oct. 16. p. 592.

During the six months from July to December, 1918, the faeces of 2,002 patients in No. 45 Indian General Hospital, Cairo, were examined. Practically all came from Palestine. The cases were partly selected as clinically suggestive of worm disease and partly taken at random. The total number of admissions to hospital during the period was 9,937, including those in the surgical division. Among those examined 28·3 per cent. showed hookworm infection, forming 5·7 per cent. of the total admissions, and in 6·8 per cent. *Ascaris lumbricoides* was detected, making 1·3 per cent. of the total admissions.

R. T. Leiper.

LABBÉ (Marcel). **Les vers intestinaux dans la pathologie du tube digestif.**—*Bull. Acad. Méd.* 1921. Jan. 4. Vol. 85. No. 1. pp. 16–18.

The author briefly summarizes the rôle of the common intestinal worms, *e.g.*, oxyuris, ascaris, trichocephalus, ankylostomes, tapeworms, in inducing irregular abdominal pains and alternations of constipation and diarrhoea, etc. A microscopical examination of the faeces should not be omitted in any case of long-standing dyspepsia.

R. T. L.

SEYFARTH (Carly). **Parasiten im Pankreas (Ascariden, Cestoden, Echinokokken, Distomen).**—*Cent. f. Bakt.* 1 Abt. Orig. 1920. Sept. 27. Vol. 85. No. 1. pp. 27–37.

The author has compiled with critical notes the bibliography of helminth invasions of the pancreas and has found in the literature 27 papers dealing with cases of Ascaridae, 24 papers on 40 cases of Echinococcus, 11 papers on 18 cases of flukes, and four papers on Cestodes which resulted in perforation of the duodenum and pancreas, and in one case in glycosuria. *Cysticercus cellulosae* has once been found in the pancreas by RAILLIET and MOROT.

R. T. L.

SCHWARTZ (Benjamin). **Hemolysins from Parasitic Worms: Preliminary Paper.**—*Arch. Intern. Med.* 1920. Oct. 15. Vol. 26. No. 4. pp. 431–435.

There is a difference of opinion among investigators as to the etiological significance to be attached to the presence of haemolysins in parasitic worms so far as the secondary anaemia of helminthiasis is concerned. The author has investigated some of the properties of these haemolysins to determine whether or not they resemble tissue lysins, and he concludes that as they are closely bound to cells of the parasites and may be liberated after thorough grinding of the worm material they partake of the nature of endotoxins. That they are liberated from the bodies of the parasites during life cannot be stated

* Professor LEIPER has not had the opportunity of correcting the proofs of this section.

on the basis of present knowledge, but the view that parasitic worms secrete toxic substances that are absorbed by the host not only affords a better explanation of the toxic symptoms of helminthiasis than the theory of "reflex action," but also provides an explanation of certain otherwise inexplicable aspects of the pathology of helminthiasis.

R. T. L.

Cort (William W.). **The Cercaria of the Japanese Blood-Fluke, *Schistosoma japonicum* Katsurada.**—*Univ. California Public. Zool.* 1919. Jan. 4. Vol. 18. No. 17. pp. 485–507. With 3 text-figs.

The cercaria of *S. japonicum* agrees with the cercariae of the two other species of human schistosomes, and it is difficult to discriminate clearly in morphological characters between these three species of cercariae. The adult structures of these cercariae are only slightly developed and adaptive larval characters for locomotion and penetration predominate. It is not possible to distinguish morphologically between male and female cercariae and the only trace of the reproductive systems which dominate the structure of the adults is a small mass of nuclei on the ventral side behind the acetabulum. The digestive system is in a very rudimentary condition. The mouth is situated on the ventral surface a little behind the anterior tip. A very narrow buccal cavity passes through the oral sucker. The oesophagus extends to about the mid-line of the body to widen into a heart-shaped structure representing the beginnings of the bifurcations of the intestinal caeca. The oral sucker has a length of more than one-third of that of the body. Its centre contains a large "reservoir"-like gland which seems to have some function connected with the penetration of the definitive host. The cephalic glands are unicellular with large nuclei filling almost all the posterior half of the body. The author counted five glands on a side. Their ducts enter the oral sucker in two groups. The glands and ducts occupy more than half of the total bulk of the cercaria, and appear to be homologous with the stylet glands of xiphidio-cercariae. The movements and activity of the cercariae on a surface are described in detail, and are correlated with the fuction of the cercaria as "primarily a machine for skin penetration, and its structure is completely dominated by those adaptive larval characters which make possible its penetration into the human host." Drawings giving clear and elaborate detail of the cercaria structure illustrate the text. The material upon which these subjects were made was received from Japan packed in dust, and upon arrival the snails appeared to be entirely dry and dead. They revived in water. The operculate forms can withstand desiccation.

R. T. L.

Cort (William W.). **Notes on the Eggs and Miracidia of the Human Schistosomes.**—*Univ. California Public. Zool.* 1919. Jan. 4. Vol. 18. No. 18. pp. 509–519. With 7 text-figs.

The internal structures of the miracidia of *S. mansoni* and *S. japonicum* are described and figured. A vitelline membrane surrounds the miracidium like a veil, and granules and oil globules are present in the intervening space. These globules were observed to be extruded

from the ducts which open on each side of the body between the cephalic region and the body proper. No evidence was obtained that these ducts were connected with the cephalic glands. The bursting of the shell seems to be due (according to the author's observations in *S. japonicum*), to the swelling caused by the action of the water, and not to any activity of the embryo. The cephalic glands in the miracidium of *S. japonicum* are smaller in proportion to the length of the body than in *S. mansoni*. Fewer germ balls are present in the posterior region than in *S. mansoni*. In two respects the excretory system of the miracidium of *S. haematobium* differs from that of *S. japonicum*. Looss shows all the tubules of *S. haematobium* to be of the same calibre and the capillaries of the posterior flame cells as much shorter than those of the anterior flame cells.

R. T. L.

SUYEYASU (Yoshio). [**Course of Invasion of** *Schistosomum japonicum* **within the Body of the Host.**]—*Kyoto Igaku Zasshi* (*Jl. of Kyoto Med. Soc.*). 1920. Jan. 20. Vol. 17. No. 1. pp. 43–60.

H. NARABAYASHI and Y. MIYAGAWA agree as to the course by which the cercariae of *Schistosomum japonicum*, after making their way through the skin of the host, reach the lung; but as to how they travel from the lung to their final place, the portal vein system, there is a great discrepancy between them. According to MIYAGAWA, the parasites are at first transferred by the pulmonary veins to the heart, and reach the portal vein through the body circulation; while NARABAYASHI is of opinion that they leave the lung along the bronchi and the wall of blood-vessels towards the lung hilus, then pierce through the loose tissue of the anterior mediastinum, and penetrating the diaphragm reach the liver.

The method of experiment adopted by the present author is as follows:—Infected snails were placed on the abdomen of mice, and were smashed, so as to let the parasites attack the new host easily. At intervals the mice were killed and examined carefully. The whole trunk was then cut in sections, and the parasites found in different parts were counted. By this method the author tried to follow the course of the parasites inside the body of the final host, and came to the following conclusions:—The cercariae which have penetrated the skin are transferred to the lung chiefly by the venous, and partly by the lymphatic, currents, and pass the right chambers of the heart. The young then leave the blood-vessels, penetrate the lung everywhere, come out into the thoracic cavity, reach the diaphragm along either pleura or mediastinum, then make their way through the diaphragm at any place into the peritoneal cavity, and at last penetrating into the liver, find themselves inside the portal vein. Such seems to be the course open to a majority of the young.

This agrees in the main with NARABAYASHI's result, but there is a difference in the channel from the lung to the diaphragm. On the other hand, the course as maintained by MIYAGAWA, if existent, cannot at least be the chief one.

Hiroshi Ohshima.

Perry (H. Marrian). **The Mechanism of Passage of Ova through the Tissues in Schistosomiasis.**—*Jl. Roy. Army Med. Corps.* 1920. Dec. Vol. 35. No. 6. pp. 487–488. With 1 plate.

Fairley's opinion that the sole function of the spine in the bilharzia egg is to enable it to pierce the venule wall, and that thereafter it plays no further part in the extrusion of the egg, is controverted in this interesting note. A microphoto is reproduced which shows that "the spine of the ovum must play an important part in the process of penetration and extrusion to the exterior. A lateral-spined ovum is to be seen lying in the tissues of the intestine, and the tract left by its passage is clearly evident. The actual stretching and severing of the connective tissue fibres in apposition to its point can definitely be observed; further, there is no marked accumulation of inflammatory cells in its neighbourhood, such as would be present had its movements been brought about by active inflammatory ulceration." The conclusion arrived at by the author is that "the migration of the ova through the tissues is largely dependent on a mechanical process in which the spines are an important factor."

R. T. L.

Cawston (F. G.). **Bilharzia-Infested Snails and their Employment as Antigen.** [Correspondence.]—*Lancet.* 1921. Jan. 29. p. 250.

At the season of the year in which the author writes (November) 1 in 6 *Physopsis africana* are infested with schistosomes, but only a small proportion of infested specimens harbour the parasite which causes disease in man, a greater number being infested with cercariae which develop into *S. bovis.* The author has found schistosome larvae in *Isidora tropica, Isidora forskali, Isidora schackoi jickeli, Physopsis africana, Limnaea natalensis* and *Planorbis pfeifferi,* but has not yet secured the adult forms of any besides *S. haematobium* and *S. bovis.* The antigen test, using *S. bovis* cercariae in liver of infected snails, was equally positive with *S. japonicum* and *S. haematobium.* The test was also positive with the serum of seven sheep that were known to harbour liver flukes.

R. T. L.

Cawston (F. G.). **Some Points in the Diagnosis of Bilharzia Disease.**—*Lancet.* 1920. Nov. 20. pp. 1045–1046.

Skin irritation is one of the first symptoms of bilharzia infection, and is frequently noted after bathing. During the succeeding few weeks there is a rise of temperature, bronchitis, urticaria, diarrhoea, abdominal pain, and there may be enlargement of the liver and spleen. A case is recorded in which there were indefinite symptoms, rise of temperature, and a skin rash of obscure origin and anaemia, some weeks after the patient had helped to find a pair of spectacles which had fallen into Till's brickfields at Durban. Later, ova appeared in the urine. The case cleared up after 16 days' course of treatment. In such uncertain cases of bilharzia infection the diagnosis may often be arrived at by the striking eosinophilia. A negative result was obtained by the antigen test in an early case.

It would appear probable that as much as three months may elapse before a patient notices any vesical symptoms. The first vesical changes are manifested by the presence of slight albumin in the urine

and some frequency of micturition. This bladder irritation may exist in patients who have no ova in their urine. Dr. LEIPOLDT considers that bilharzia infection is the probable source of a child's backwardness, and proposes a routine examination of the urine for ova whenever boys are behind their standards in endemic areas.

Bilharzic patients frequently show every indication of stone when none can be found. On operation such cases reveal much-injected kidneys and the presence of numerous bilharzia ova. The accumulation of ova in the vermiform appendix commonly produces attacks of appendicitis. Bilharzia disease is sometimes responsible for diffuse nervous conditions. A case is recorded where these and left-sided optic atrophy were associated with marked albuminuria and severe bilharzia infection. After a course of injections the "epileptic" fits disappeared. In Dr. MURRAY'S hands the antigen test has been of value to the author in elucidating several pathological conditions of obscure origin.

R. T. L.

NEVEU (R.). **Notes sur quelques cas de bilharziose vésicale et sur un cas de bilharziose intestinale observés pendant la guerre.**—*Rev. Méd. et Hyg. Trop.* 1920. Vol. 12. No. 2. pp. 35–36.

Notes are given of three case of bilharzia infestation which occurred in the Senegalese regiments. They indicate the frequency with which the disease may be found in indigenous troops, and illustrate some of the more striking errors into which one may be led in diagnosis. Case (i) was diagnosed as one of traumatic haematuria. Case (ii) as "probably vesical bacillosis." Case (iii), a case of "haematuria." In all three cases microscopical examination of the urine revealed typical terminal-spined eggs of *S. haematobium*. The cases were all from Sénégal, one from St. Louis, the two others from the district of Mossi, Upper Senegal. A case of intestinal bilharziasis due to *S. mansoni* is also mentioned. The patient was for some time treated without success for amoebic dysentery.

R. T. L.

CHRISTOPHERSON (J. B.). **On the Action of Tartrate of Antimony in Intravenous Injections. The "Permeability" of Bilharzia Ova and Some Protozoal Organisms.**—*Brit. Med. Jl.* 1920. Dec. 4. pp. 854–855.

The drug appears in the blood-stream as antimony tartrate when given intravenously, and it does not seem to be necessary, therefore, in explanation of the action of antimony tartrate in bilharzia disease, to introduce the complicated picture of antibodies and indirect action on the parasite. That the bilharzia eggs are permeable is shown by the fact that the use of formalin as a deodorant in the examination of faeces sterilizes the bilharzia eggs, whereas the hookworm eggs are unharmed. If one-tenth of a cc. of urine laden with ova is diluted with 6 cc. of tap water at 130° F., the ova hatch out in from five to 10 minutes. If one grain of antimony tartrate is added before the hatching, about one-half hatch. The addition of about 2 grains of antimony tartrate to the 6 cc. just about stopped the hatching process altogether. From these and other experiments the author concludes that the drug has a profound and direct specific effect on bilharzia in all its stages.

R. T. L.

i. Esser (S. J. D.). **Emetine in Bilharziasis.** [Correspondence.] —*Brit. Med. Jl.* 1920. Oct. 23. p. 645.

ii. Balfour (Andrew). **Emetine in Bilharziasis.** [Correspondence.] —*Ibid.* Oct. 30. pp. 681–682.

iii. Harkness (A. H.). **The Superiority of Sodium Antimony Tartrate to Emetine in Bilharzia.**—*Ibid.* Dec. 11. p. 890.

i. Dr. Esser inquires on behalf of those who, like himself, are working in bilharzia-infested districts, if emetine is as efficacious as tartar emetic in bilharziasis, and if it can be satisfactorily given as an intravenous injection.

ii. Replying, Dr. Balfour gives a useful bibliography and a summary which shows that sufficient evidence has possibly not yet been adduced to warrant its substitution for antimony. The drug was given by intramuscular injection in doses which apparently varied from 1·54 gr. (0·1 gm.) to 3·08 gr. (0·2 gm.). The intravenous method of injection of emetine is unsuitable, as Dale has found that given in this way the drug exhibits its greatest toxicity, while there is no advantage in therapeutic efficiency. Diamantis, however, records success in simple non-septic cases after 15 to 20 intravenous injections of 0·02 to 0·1 gm. at intervals of two or three days.

iii. Dr. Harkness, continuing the above discussion, records his own case, in which all recognized forms of treatment, including emetine, had been tried, and in which an apparently complete cure was eventually effected by the intravenous injection of sodium antimony tartrate. Dr. Harkness says he experienced no inconvenience during the course of treatment, and, in fact, owing to the exigencies of his profession, had to carry on his ordinary work throughout the treatment.

R. T. L.

Tanon, Cambessedès & Pamela. **Un cas de bilharziose intestinale traitée par des injections d'émétique.**—*Rev. Méd. et Hyg. Trop.* Vol. 12. No. 3. pp. 65–68.

An infant, five years old, recently brought from Martinique, began to pass twice daily in recurring periods soft stools with some blood at the end of defaecation. The gradual change in the general condition and the anorexia and anaemia led to an examination of the faeces, and the lateral-spined eggs of *S. mansoni* were found. Intravenous injections of tartar emetic were instituted—a solution of 1 cgm. in each cc. The injections were made about every third day. First injection was ½ cgm., the second, third and fourth were of 1 cgm. each, the fifth of 2 cgm. On the first day of treatment 30 eggs were found in six micro-preparations; only two eggs were found after the fourth injection. After this treatment the patient left the hospital, but six days later 25 eggs were found in the faeces, and an increased dosage of 3 cgm. in 1 cc. was commenced. Later a dose of 5 cgm. was followed seven days later by 7 cgm. without incident. Ten days after the last injection, however, the mother brought the child back on account of sickness and vomiting. A month later a pair of living adult bilharzia worms were found in the faeces. The female contained numerous eggs. At a later date a further stool examination was made and two eggs were found. The child's general health is reported as much improved, and there has been no further trouble either with digestion or with defaecation.

The author remarks upon the delayed symptoms of intoxication following the injection of 7½ cgm. of tartar emetic. R. T. L.

Cawston (F. G.). **Some Infections due to Freshwater Snails and their Eradication.**—*Jl. Trop. Med. & Hyg.* 1920. Nov. 15. Vol. 23. No. 22. pp. 274–276.

The freshwater fishes feed upon cercariae and "millions" are particularly useful. The addition of common salt to water is probably the best means of freeing green food, particularly watercress, of cercariae. Bilharzia cercariae and allied forms are quickly destroyed by Sir R. Ross's larvicide. Wild birds feed upon freshwater snails, but carry the eggs and minute snails upon their feet, but the domesticated duck keeps ponds remarkably free. A pond at Sydenham, which formerly was well-stocked with bilharzia-carrying snails, has been freed of them within a month by the introduction of three white ducks. Of prime importance is the constant removal of rushes, water weeds, lilies and floating sugar-cane from the rivers. Especial attention should be given to dams. The removal of infected pupils from the large missionary institutions near the sources of some of the South African rivers is advocated, and the prophylactic value of treatment is such as to warrant the organization of travelling hospitals for outlying districts.

R. T. L.

Maplestone (P. A.). **A Note on *Hymenolepis nana* in North Queensland.**—*Med. Jl. Australia.* 1920. Oct. 23. No. 17. pp. 394–395.

The examination of a large number of centrifuged stools inaugurated with the hookworm campaign in North Queensland has revealed the occurrence of *Hymenolepis nana* eggs in a relatively large number of the inhabitants. Of 14,577 persons examined in 1918 by Waite, 51 (*i.e.*, 0·35 per cent.) had *Hymenolepis nana*. During 1920 this worm occurred in 13 out of 72 inmates (*i.e.*, 18 per cent.) of the Townsville Orphanage. The differences in the figures is probably due partly to the difference in numbers examined, and to the fact that *H. nana* is more common in young children than in adults. Gastro-intestinal derangements, sometimes with various nervous signs, are common in children infected with *H. nana*, but in Australia so far no uncomplicated cases with symptoms have yet been observed. Breinl has made unpublished observations on mixed infections of *A. duodenale* and *H. nana* in Italians in North Queensland. Symptoms of gastric pain and discomfort persisted after the entozoal infections were eradicated. A remarkable case is quoted of a child of 10 years of age, apparently in perfect health, in whose stool eggs were found in large numbers. After a single treatment with *extr. filicis maris* over 1,000 worms were recovered from the stool.

R. T. L.

Goldman (Alfred). *Hymenolepis nana*; **Possible Cercocystis Stage.**—*Arch. Intern. Med.* 1920. Sept. 15. Vol. 26. No. 3. pp. 373–380. With 2 text figs.

No case of infection with *H. nana* has been reported from the region of St. Louis, U.S.A. The seven cases recorded in this paper were seven children of a coloured family which came to that city in 1917 from Mississippi. In one of the cases which entered hospital on account of severe diarrhoea male fern was given but no worms

were passed, although two days before numerous eggs of *H. nana* had been detected in the faeces. The stools remained free from eggs for an interval of seven days. Treatment was renewed and at least 1,000 *H. nana* were obtained. The stools were again free from eggs until the thirteenth day, when many small circular bodies from 5 to 15μ in diameter, and bounded by a thin membrane, were noticed. On the succeeding day, for the first time, *H. nana* eggs were observed with fewer of the smaller bodies. A few weeks later the stool was soft, yellow, bloodstreaked, and contained a large number of eggs. An eosinophilia of 2 to 3 per cent. occurred in those children without symptoms, while in those with definite symptoms it ranged from 6 to 9 per cent. The author fed eggs and mature segments to six mice and six rats without result. Attempts to develop the eggs by incubation in artificial gastric juice were also unsuccessful. Lice and bed bugs taken from the insanitary house in which the family lived were negative. There were no rats, but characteristic eggs are said to have been present in the faeces of a pet dog, although adults could not be found among the specimens of *Dipylidium caninum* and *Taenia serrata* recovered at post mortem.

The sac-like bodies passed after vermifuge varied in shape, being elliptical, ovoid, or approaching a sphere. Each homogeneous structure surrounded a head with four suckers and a hook-crowned rostellum. These are thought possibly to represent the cercocyst stage of the dwarf tapeworm. The occurrence of auto-infection is proved by the large number of worms present, and the difficulty in getting rid of them completely.

R. T. L.

Saeki (Yoshihisa). [**Experimental Studies on the Development of** *Hymenolepis nana*.]—*Jika Zasshi* (*Jl. of Pediatrics*). 1920. Mar. 20. No. 238. pp. 203–244. With 28 tables and 4 plates.

Having obtained from time to time numerous supply of the eggs of *Hymenolepis nana* from a girl of nine years of age, the author made a series of experiments by feeding animals on these eggs. The results obtained with mice and albino and house rats were in most cases equally positive, while of the two young monkeys one was not seen affected.

About 10 hours after the eggs had been swallowed by the animals, oncospheres were found inside the slightly-destroyed papillae of the upper and middle parts of the small intestine. Cysticerci were formed after four days, and after five days the young could be seen freely inside the intestinal canal, mostly at the last portion of the small intestine. After eight days proglottid formation began. Genital organs could be made out after nine days. After 14 days full-grown proglottids were found filled with eggs within which oncospheres could be distinctly made out. After 16–17 days ripe eggs could be found in faeces. After a month or more the host became free from the parasite.

The author himself swallowed about 1,000 of the eggs at a time, but all his experiments, repeated four times, were failures. A similar experiment with a four-year-old girl proved successful. A few eggs were found in faeces after 19 days, and after 62 days, by use of the anthelmintic, 97 ripe worms were obtained.

Thus, both from experiments with the child and on some animals, especially the rats and mice, it is concluded that the infection of *Hymenolepis nana* is direct, without any intermediate host.

Hiroshi Ohshima.

Low (George C.) & O'Driscoll (Elizabeth J.). **A Case of *Dibothriocephalus latus* Infection.**—*Brit. Med. Jl.* 1921. Jan. 22. p. 118.

Imported cases of infection with the broad tapeworm are occasionally found in England. Recently a Finn, who had come to England in the course of his vocation, was admitted to the Seamen's Hospital, Greenwich, complaining of pains in the abdomen of an obscure nature. The case was diagnosed there, and an absence of eosinophilia noticed. As cases of this infection are rarely seen in England, he was transferred before treatment to the Hospital for Tropical Diseases for the purposes of study. The authors record their success in eliminating the parasite by administration of Filix mas extract in three doses of 20 minims at half-hour intervals followed three hours later by a saline purge.

R. T. L.

Surrel. **Kyste hydatique du poumon décelé par la radiographie.**—*Rev. Méd. et Hyg. Trop.* 1920. Vol. 12. No. 2. pp. 33–35. With 1 text fig.

A young girl, 20 years of age, who three or four days previously had some slight haemoptysis, was sent for radiographic examination to confirm the physical signs: modification of respiration at the left apex, increase in thoracic vibrations and in the vocal resonance, harsh respiration. The X-ray screen showed marked diminution in the transparency of left apex and some diminution also in that of the left sub-clavicular region. The transparency of the right apex and sub-clavicular region was normal, but there was seen at the level of the second rib and about 6 cm. to the right of the middle line a shadow of the diameter of a two-franc piece with smooth circular contour and uniform density. This shadow moved with the movements of the lung during respiration. These features suggested a diagnosis of hydatid cyst. The blood was then examined, and was reported as giving a feeble positive reaction to the complement deviation test of Weinberg. The eosinophiles were more abundant than normal. No clinical signs were traceable to the cyst, which was revealed solely by radiography.

R. T. L.

i. Dévé (F.). **Cirrhose biliaire hydatique.**—*C. R. Soc. Biol.* 1920. Oct. 16. Vol. 83. No. 28. pp. 1263–1265.

ii. ——. **Siège de l'orifice de communication des kystes hydatiques du foie ouverts dans les voies biliaires.**—*Ibid.* Oct. 23. No. 29. pp. 1306–1307.

iii. ——. **La débacle hydatique cholédoco-vatérienne.**—*Ibid.* Oct. 30. No. 30. pp. 1338–1340.

iv. ——. **L'élimination périodique prolongée des kystes hydatiques du foie dans les voies biliaires.**—*Ibid.* Nov. 6. No. 31. pp. 1366–1367.

v. ——. **La débacle hydatique biliaire a-t-elle une valeur curative?**—*Ibid.* Nov. 13. No. 32. pp. 1384–1386.

i. In addition to those cases of chronic jaundice resembling Hanot's disease and the accidental association of hypertrophic biliary cirrhosis occurring with a hydatid cyst of the liver, there is unquestionably a cirrhosis of toxic origin from prolonged bile retention due to compression of the bile duct by hydatids. In such cases the author believes that surgical intervention may be beneficial if the obstruction can be removed thereby and the chief bile channels drained.

ii. The author differs from the accepted view that hydatid cysts commonly rupture into the bile duct and gall bladder. In 90 per cent. of his 140 cases the opening was into the intrahepatic biliary vessels—into the right hepatic biliary canal twice as frequently as into the left.

iii. The discharge of hydatid cysts of the liver in the bile passages gives a symptom syndrome characterized by (1) hepatic colic; (2) jaundice; (3) presence of hydatids in the stools; the last being the pathognomonic indication. The author analyses the observations of 76 cases. Hydatidemesis occurred in 5 per cent. Hydatid discharge in the faeces was observed in 78 per cent. Hydatids both in the vomit and in the stool occurred in 17 per cent. As many as several hundred hydatids may be suddenly voided. The discharge is immediately followed by a cessation of hepatic pain and by a fall in the fever, sometimes with collapse and heavy perspirations. There is also a sudden decrease in the size of the liver or of the tumour where this has been made out. Almost immediately afterwards there was urticaria in seven cases. In favourable cases the jaundice vanishes with diuresis. The appetite and sleep return and the general health rapidly improves. This evacuation of hepatic cysts into the bile passage appears to be one of the most common methods of discharge, exceeded in frequency only by rupture into the peritoneum and into the thorax. The failure to recognize this condition is attributed to the neglect of sifting of the stools.

iv. That the repeated evacuation of hydatid cysts into the biliary passages may occur over a period of months and may result in cure without surgical intervention is illustrated by the author in one series of cases where the hydatids were found in the stool, and in a further series where the autopsies were obtained.

v. In this note the author deals with the question whether the spontaneous discharge of the hydatid cysts into the biliary passages, resembling as it does the vomiting of the hydatid of the lung, actually leads to a permanent cure. In 48 cases which had been left to their natural evolution there were 14 deaths. In only 12 cases the cure was verified several years later. At the autopsies occasionally a pocket was found still full of hydatids and communicating with the bile passages. Such lesions form a perpetual menace to the patient. The complications especially to be feared are the obstruction of the bile duct by the parasitic membrane and the biliary infection which often supervenes. Two complications merit especial note: (*a*) the suppuration, with gas production, of the original cyst (10 per cent. of cases), and (*b*) the opening of the cyst secondarily into the pleuro-pulmonary system (18·5 per cent. of cases). In spite of the apparent cures which arise the author advises surgical intervention where the diagnosis is well founded.

R. T. L.

Chauffard, with Lejars, Ronneaux & Brodin. **Diagnostic clinique et ablation opératoire d'un kyste hydatique calcifié du foie.**—*Bull. Acad. Méd.* 1920. Oct. 26. Vol. 84. No. 33. pp. 160–166. With 1 fig.

In the natural evolution of hydatid of the liver there is a somewhat rare clinical type in which a natural cure follows the death of the hydatid. The hydatid fluid is absorbed, and the cyst atrophies, eventually becoming a small calcified mass in the liver parenchyma.

Such a mass of parasitic origin is usually found at the post-mortem, but on rare occasions it may become the seat of infection, necessitating surgical intervention. The author gives the clinical history of a case in which secondary pericystic infection of a calcified hydatid of the liver supervened on an attack of influenza. In these cases radiography is of the utmost value.

R. T. L.

Sherwood (Walter A.). **Echinococcus Cyst of the Liver. Case Report.**—*Long Island Med. Jl.* 1920. Oct. Vol. 14. No. 10. pp. 377–380. With 2 text figs.

A tentative diagnosis of hydatid cyst was made in the case of a young woman, a native of Greece, who was admitted to the Brooklyn Hospital complaining of weakness, cough, and enlargement of the abdomen, which had steadily progressed in severity over a period of 16 months. The patient was emaciated, sickly looking, with pale sallow skin and pinched features. There was slight jaundice and a constant distressing cough. From the angle of the scapula downwards on the right side posteriorly there was absolute flatness. A large tense abdominal tumour protruded in the right hypochondrium and was evidently associated with the liver. There was no hydatid fremitus or fluctuation. The laboratory findings were negative. The differential count of the leucocytes was not suggestive. X-rays revealed an enormous tumour occupying the right side of the abdomen, crowding upwards to the level of the scapular angle the right half of the diaphragm. Two operations were done. In the first the tumour was exposed through the right rectus muscle, and five quarts of pale limpid fluid were removed by trocar and canula. The wall of the cyst was totally removed, and was found to show the typical laminated and hyaline structure of an echinococcus cyst, with a few daughter cysts adherent to the surface. Further X-ray examination revealed the persistence of a dense shadow below and above the diaphragm. At the second operation the upper part of the right lobe of the liver was exposed by the transpleural method of approach ; portions of the seventh and eighth ribs having been removed in the posterior axillary line. A secondary cyst containing daughter cysts was removed and communication was made with the site of the first operation, thus establishing thorough drainage. Although the patient's condition improved, the physical signs suggested the accumulation of fluid in the pleural cavity, and large quantities of foul-smelling pus were removed on two occasions by aspiration. Later the persistence of cough, fever, and the expectoration of foul-smelling muco-purulent material suggested the development of pulmonary abscess, which was drained. Thereafter recovery was progressive and uneventful.

R. T. L.

Ginsberg (Louis). *Strongyloides intestinalis* **Infestation : Report of a Case.**—*Jl. Amer. Med. Assoc.* 1920. Oct. 23. Vol. 75. No. 17. p. 1137.

Infestation with *Strongyloides intestinalis* or *stercoralis* rarely occurs in the northern part of the United States. Its geographical distribution follows closely that of the hookworm. The author reports a case from Johnstown City Hospital, Pa. The patient was native-born, and had lived her whole life in the western part of Pennsylvania. The

symptomatology of the illness, which is attributed to the strongyloides infection, is detailed. There was swelling of the feet, followed by headache, and later by swelling of the hands. Diarrhoea was a constant feature. The stool was dark green and fluid, with six to 12 evacuations a day. The temperature was about 102° F., the pulse frequent and feeble, and the respirations rapid and laboured. There was a red-streaked sputum, with an annoying bronchial cough. The sputum was not examined microscopically. The urine was dark, scanty, and foul-smelling. A few days before death defaecation and urination became involuntary. There was no eosinophilia. Active motile worms were seen with the low power of the microscope. The worms measured 0·7 to 1 mm. in length, and the oesophagus had a double dilatation. "There were three small curved spicules at the base of the tail." Dram doses of glycerin four times a day were administered, followed by thymol. A necropsy was refused.

R. T. L.

Willis (H. Hastings). **A Note on the Value of Oil of Chenopodium in the Treatment of Strongyloides Infection.**—*Med. Jl. Australia.* 1920. Oct. 16. No. 16. pp. 379–380.

During the hookworm campaign in the Lower Burdekin area near Townsville, Queensland, 60 persons out of 223 examined for hookworm were found to harbour strongyloides although in good health. Oil of chenopodium was administered in 0·06 mil for each year of age up to 20 years, and 1·5 mil for adults. The treatment, given as a single dose on an empty stomach, was followed in an hour by a purgative dose of magnesium sulphate. There was no preliminary purgation. The treatment was repeated after seven days. Forty-eight persons were so treated. A fortnight after the second treatment neither eggs nor larvae could be found in the stools, and the same result was obtained at a later examination made six weeks after the administration of the second treatment. From these observations the author concludes that oil of chenopodium is an efficient vermifuge for strongyloides infestations.

R. T. L.

Fennell (Robert F.). **"Further New Zooparasites of Man."** [Correspondence.]—*Jl. Amer. Med. Assoc.* 1920. Aug. 28. Vol. 75. No. 9. p. 625.

The statement that the newly discovered viviparous parasite *Rhabditis hominis*, reported from Seoul, differs in at least one respect from *Strongyloides stercoralis* (*i.e.*, that the ova are found in the faeces in the latter infection) is questioned by the author of this note, who has over a long period of years never seen the *Strongyloides stercoralis* ova in the stool. [The adult stages have since been figured, however.]

R. T. L.

i. Tamura (Harukichi). [**On Creeping Disease.**]—*Hifu-Ka oyobi Hinyôki-Ka Zasshi* (*Jl. Dermat. & Urol.*). 1919. Oct. 20; Nov. 20. Nos. 10 & 11. pp. 827–834; 891–910. With 3 plates.

ii. Fujita (Hidekazu). [**A Case of Creeping Disease (due to ? Gnathostoma).**]—*Ibid.* No. 10. pp. 835–837.

iii. Ikegami (Yutaka). [**On the Cause of Creeping Disease.**]—*Ibid.* No. 10. pp. 838–846.

i. A married woman who had lived for years in China (Tien-tsin and Hankow), aged 41, suffered from a creeping disease. On the right side of her breast a curved, and afterwards branched, linear

swelling was observed. It measured 4·5 cm. in length, 1–2 mm. in breadth, and was raised 1 mm. above the level of the skin. The colour was yellowish-white, except at one end, where the patient felt a pain intermittently; this part was intensely red in colour. The author was successful in digging out a worm with a needle, and a small portion of the affected skin was then removed and examined by means of cutting sections. A continuous tunnel was found to have been formed, partly running through the epidermis and partly deeper, its floor reaching the corium. The worm was blood-red in colour, 9 mm. in length and 1 mm. in diameter. The disc-like anterior end was provided with eight transverse rows of hooks. The anterior half of the body was covered with minute scales, while the remaining part was naked and strongly coiled at the hind end. There is hardly any doubt that the worm was a male of *Gnathostomum*, much resembling *G. siamense*.

After briefly describing 38 foreign and five Japanese recorded cases of creeping disease, the author proposes to classify them into seven forms according to their symptomatic differences.

ii. A case of creeping disease was observed in a Chinese. He was 32 years old, born in Canton, and came to Hankow two years ago. Starting at the middle line of his breast, a linear swelling extended towards both sides, and at the end of two weeks it was found running nearly transversely from the left arm-pit to that of the right side, then bending upwards, to end at the distal end of the clavicle. The total length measured 77 cm., and its broadest part was 2 cm. in breadth. From examination by means of sections the author could not make out any trace of a tunnel or of a parasite.

iii. The patient was a 50-year-old Japanese who had lived in Formosa for 21 years, and recently came to Amoy. The swelling was found on the belly, starting a little above the navel, running towards the right side and upwards, meandering as it ran, and forming three tubercles in its course. The total length measured 21 cm., the breadth 1–1·5 cm. The first part was of a yellowish colour, the last (the end of the right side) light red, while the middle portion was dark red. The author secured a parasitic worm which he picked out with a needle from the pale white spot at the centre of the swollen, light-coloured end. The pain disappeared soon after the removal of the parasite.

The worm was young, probably referable to *Echinorhynchus sphaerocephalus*, but there was a structure like the alimentary canal, the presence of which suggests its belonging to *Gnathostomum*. The length of body measured 2 mm., diameter 0·4 mm.; colour, light brown-yellow. Anteriorly the body ends in a proboscis beset with five rows of hooks, each row consisting of 15–25 hooks. Proboscis sheath, lemniscus (?) and bursa copulatorix could be distinguished.

Hiroshi Ohshima.

Rockefeller Foundation. International Health Board. **Hookworm and Malaria Research in Malaya, Java, and the Fiji Islands. Report of Uncinariasis Commission to the Orient, 1915-1917.** [Darling (S. T.); Barber (M. A.); Hacker (H. P.)].—191 pp. With 97 text figs. 1920. New York City.

The Commission was appointed "to determine to what degree Uncinaria infection is a menace to the health and working efficiency of the people in the country under consideration." The intimate

relation found to exist between malaria and hookworm disease as disabling factors made it necessary for the Commission to devote almost as much time and study to malaria as to hookworm disease, in order to determine the relative importance of the two infections as causes of anaemia. The findings concerning hookworm are as follows : The determination of hookworm by vermicidal treatment is more accurate than by microscopical examination. Where a percentage of 80 was obtained by the method of examination for ova there is little doubt that a percentage of 90 or more would have been obtained by the method of treatment. Experiments designed to test the relative efficacy of various methods of treatment led to the conclusion that "chenopodium in small doses proved to be more efficacious than small doses of thymol." While, dose for dose, both drugs showed about equal efficacy in removing Necators, chenopodium was quite superior in removing Ancylostoma and also other worms, *e.g.*, Ascaris and Trichocephalus. There was failure to remove all hookworms in 23·6 per cent. of the cases treated with thymol, but in only 7·6 per cent. with those treated with chenopodium. Better results are obtained from chenopodium when it is given in the original form of an oil than as an emulsion. Better results are obtained from thymol when the drug is especially prepared in an emulsion than when it is administered in the form of a powder. The half maximum dose of chenopodium (0·5 mil three times, or a total of 1·5 mils, *i.e.*, 1½ cc.) is, in the experience of the Commission, the best treatment as a routine, for while it does not have the toxic effects of the full dose it was found that it will, in two treatments, remove about 99 per cent. of all the worms present. The efficacy of chenopodium continued high even when the dose was reduced to one quarter of the maximum, while the diminution of the dose of thymol rapidly affected its efficacy.

The relative cost of these treatments was estimated. That of chenopodium is less than one-half as much as the equivalent treatment with thymol. The after-effects of treatment, such as dizziness, unsteadiness of gait (drunkenness), inability to rise, semi-comatose state, tingling of hands and feet, deafness, burning in the stomach and headache were more complained of after the use of chenopodium than after treatment with any other vermicide. Giddiness was always experienced, usually after the second dose, by all persons and was more marked among men than women. The more severe symptoms very rarely followed chenopodium used as an emulsion ; only one out of 175 persons so treated complained of deafness. When the oil was given in capsules, from 16 per cent. to 20 per cent. complained of deafness. Among the immediate after-effects of treatment by vermicidal drugs is a temporary fall or net loss in haemoglobin and in erythrocytes. In anaemia cases both haemoglobin and erythrocytes mounted almost immediately after treatment, and within a week would return to normal.

Experiments upon purges, *e.g.*, compound mixture of senna (2 oz.), castor oil (1½ oz.), magnesium sulphate (1 oz.), calomel (4 gr.), indicated that these had little or no effect on the value of vermicidal treatments.

The various kinds of hookworms differ in their resistance to a given dose of vermicide. Necators are less resistant than Ankylostomes, and the males are less resistant than the females. The resistance appears to increase also with the size of the worms. These differences become less marked as the dose is increased. It is easier to remove a high percentage of worms when there are many worms present than when there are few.

A racial difference between Tamils and Chinese was apparent from the work done at the District Hospital at Kuala Lumpur. While Tamils harboured many worms and suffered severe anaemia there was no record of mortality, although they harboured almost as many hookworms as the Chinese and their haemoglobin was nearly as low. This "racial" difference in severity may possibly be due to the fact that the *Ancylostoma duodenale*, which the Chinese harbour in larger numbers, inflict more serious wounds in the mucosa than the Necators.

At Viti Levu (Fiji), hookworm infection was found to occur in 100 per cent. of the adult male Indian and Fiji populations. *Necator americanus* and *Ancylostoma ceylanicum* were found in native Fijians living in remote districts out of contact with Indian sources of infection. In them *Ancylostoma duodenale* was never present. A statistical study is made of the "hookworm species formula according to race," and it is considered that the ankylostome index possibly affords a clue to the ethnic origin or composition of the natives of Malaya, Java, and the other Islands of the Netherlands Indies, and that a high *Ancylostoma duodenale* formula indicates a large admixture of ethnic stocks from Northern India or elsewhere.

In a study of haemoglobin standards in relation to race, age, and sex, many interesting facts are brought out. It was found that age influences the normal haemoglobin values, not merely during adolescence, but during the entire period of life, so that a different value must be assigned to each decade. There is a very marked difference between the haemoglobin values of normal men and women, averaging among Tamil coolies about 10 per cent. higher than among the women. The effect of pregnancy on the haemoglobin is very striking, and is especially noticeable in the later months, often amounting to as much as 15 per cent.

In the Federated Malay States so much malaria was found that it was quite hopeless to estimate the relative importance of hookworm and malaria in the causation of anaemia. From studies based on small areas—*e.g.*, in Suva, where malaria was absent—the data obtained indicated that in regions where hookworm infection is uncomplicated by malaria persons may harbour a considerable number of worms without showing any measurable degree of anaemia. In the higher grade of hookworm infection, where the number of worms mounted into hundreds, a given number of worms caused a certain degree of anaemia. In such cases it was concluded that in places like mid-Java eight worms in a boy and 12 worms in a man may cause a haemoglobin reduction of one degree. This can be measured where the average worm-counts of the boys are over 100 and of the men over 200. Hard labour and sub-nutrition are undoubtedly strong factors for accentuating the anaemia of people suffering from either malaria or hookworm. Attention is drawn to a series of cases in which severe malaria (cachexia), with anaemia, oedema, and debility, give rise to the wretched physical condition which practitioners and laymen usually diagnose as cases of ankylostomiasis.

R. T. L.

Royer (E. Ray). **Hookworm and Other Intestinal Parasites in Ecuador.** —*Jl. Amer. Med. Assoc.* 1920. Dec. 18. Vol. 75. No. 25. pp. 1702–1705. With 2 text figs.

As a result of a survey of the employees and dependants of the mines of the South American Development Co., which are located

in Portovelo, near Zaruma, in the Ecuador Andes, at an altitude of 2,000 ft., it has been found that hookworm disease is very prevalent, and that both *A. duodenale* and *N. americanus* are present. "*Trichocephalus dispar* and *Ascaris lumbricoides* are found in a large percentage of the population, and diarrhoea and subsequent anaemia are not unusual sequelae." Chenopodium was ineffective against the whipworm, which occurred in 84·5 per cent. of 1,109 cases under observation. The author questions whether there is "a specific toxin generated in pulmonary tuberculosis which is inimical to the development of hookworm in a host so affected." While the average infestation was found to be 58·66 per cent. of the employees surveyed, no hookworms occurred in 46 employees suffering from tuberculosis, though other parasitic worms were present in about the usual number.

R. T. L.

YOSHIDA (Sadao). **A New Course for Migrating Ancylostoma and Strongyloides Larvae after Oral Infection.**—*Jl. Parasit.* 1920. Sept. Vol. 7. No. 1. pp. 46–48.

The course of the migrating larvae of ancylostoma and strongyloides is essentially the same after skin and oral infection in the two genera. Sooner or later the larvae migrate into the lungs by the blood-vessels or lymph system, and the majority pass through the trachea, oesophagus and stomach to the intestine, but a few reach the intestinal wall direct by the pulmonary vein and systemic circulation. Although this is now recognized universally, it appears from the author's researches that there is another subsidiary route. Larvae introduced into the alimentary canal may appear in the abdominal and pleural cavities at least 24 hours later, and may penetrate into the liver, pancreas and lungs. Strongyloides larvae smeared on the shaved skin of the abdomen may appear in the abdominal cavity or in its viscera in about 24 hours by piercing directly through the abdominal wall. Some of the larvae apparently invade the pleural cavity directly by piercing the oesophagus, but the more common and usual course is for the larvae, after piercing the intestinal wall, to migrate through the diaphragm from the abdomen to the pleural cavity. The presence of strongyloides larvae, reported by FÜLLEBORN, in the liver and kidneys is attributable to direct invasion from the abdominal cavity.

R. T. L.

LANE (Clayton). **The Mass Treatment of Hookworm Infection.** [Correspondence.]—*Lancet.* 1920. Sept. 25. pp. 673–674.

A reply is made to the contentions of Dr. DARLING that the diagnosis of ankylostome infestation by microscopical examination of the faeces as now carried out in hookworm campaigns is expensive, time-consuming, and untrustworthy, and that (disinfestation by anthelmintics being impossible and unnecessary) promiscuous treatment is all that is needful. It is contended that "the benefits which can, at least temporarily, be conferred upon hundreds of millions of persons, should not be withheld because our methods are admittedly imperfect; so long as it is clearly recognized that they can only be temporary

and correspondingly costly." Meanwhile, research must be urgently pressed towards (*a*) the determination of the best method of mass diagnosis of eggs in the stools; (*b*) the production of a drug which will, without risk to the host, remove all hookworms at a single dose; (*c*) the designing of a cheap, effective, sanitary and fool-proof latrine suitable for a large family in the tropics.

R. T. L.

YEN (F. C.). **The Control of Hookworm Disease at the Pinghsiang Colliery, Ngan Yuen, Kiangsi.**—*Nat. Med. Jl. China.* 1920. June. Vol. 6. No. 2. pp. 71–92. With 2 charts.

This report is chiefly of interest as representing the first work of any size which has been undertaken hitherto to control hookworm infection in China. The campaign was conducted under the auspices of the International Health Board, and conformed in essentials to those in operation elsewhere. Of the underground workers, 18,608 were examined, and 56·79 per cent. were found infected, while in 51·925 per cent. of the 3,553 surface employees the findings were positive. The company has now formed a permanent Sanitary Department to look after all matters pertaining to sanitation. Provision has been made for toilet facilities underground. On the surface new latrines have been constructed. The collection and transportation of nightsoil have been organized. To preserve the fertilizing value of the nightsoil, pits of brick lined with cement were constructed, each with a capacity to store all faeces collected in a month. It has been found, however, that live larvae were present in one of the pits after nine months of storage. A résumé of the difficulties encountered, and of the results achieved, is related in a concluding paragraph.

R. T. L.

MINAGAWA (Kôki). [**Preventive Experiments on Hookworm Infection.**] —*Tokyo Igakkai Zasshi* (*Jl. of Tokyo Med. Soc.*). 1919. Nov. 5. Vol. 33. No. 21. pp. 1099–1115. 2 plates.

The use of nightsoil as manure as generally practised in Japan necessitates a thorough disinfection to prevent the propagation of any endoparasitic worms. One of the most effective and inexpensive ways of disinfecting nightsoil is known to be the mixing of urine with it. When either eggs or young of the canine hookworm are subjected to the action of human urine, they cannot develop further and at last die out. The author has tried to furnish experimental proof of this. Some small areas of ground were impregnated with dogs' faeces, which was left for 10 days after being either (1) mixed with human urine, or (2) mixed with water. Young dogs were then moistened, and put in these areas for four to 24 hours. After eight to 22 days the dogs were killed and examined. The dogs put on the soil which had been impregnated with faeces simply mixed with water became very heavily infected, while the other lot which had been in contact with the soil treated with human urine had only a few worms, at most 26 in number. Some pathological features in the dogs affected, both severely and only slightly, are further described.

Hiroshi Ohshima.

Stewart (F. H.). **Life-history of** *Ascaris lumbricoides.*—*Brit. Med. Jl.* 1920. Nov. 27. pp. 818–819.

In a preliminary note to a paper shortly to appear in *Parasitology* Stewart records the results of some recent experiments on three-day-old sucking pigs. Four pigs were fed with ripe eggs of *Ascaris suilla*. All suffered from ascaris pneumonia on the seventh and eighth days after infection. One died during the night of the 7–8th. The remaining three pigs were killed on the 15th, 17th and 19th days, and larvae measuring from 3 to 7 mm. in length were found in the small intestine. The larvae, which still required to undergo a further moult before becoming adult, were embedded in abundant muco-pus. The intestine was in a condition of catarrh. It is "extremely probable that the worm can undergo full development in one host alone—that is, man or the pig."

R. T. L.

Bourges (Henry). **Syndrome d'ictère hémolitique acquis au cours d'une lombricose. Rôle pathogénique des toxines ascaridiennes dans la genèse du processus de destruction globulaire.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1920. Dec. 9. No. 37. pp. 1491–1494.

A case of jaundice is recorded as attributable to infection with *Ascaris lumbricoides*. The patient was a young soldier who was admitted to hospital for anaemia, weakness and splenic hypertrophy, and with a history of recurring attacks of fever. The blood examination on admission showed 7 per cent. of eosinophiles. As two specimens of Ascaris were passed spontaneously, santonin was given for three days. Thirteen worms were evacuated. At intervals of eight days a further series of santonin doses was administered, and 14 worms were passed. The patient thereafter gradually improved. The pallor diminished, and the yellow tint of the conjunctiva disappeared. The globular resistance of the red blood corpuscles increased, and the blood count now gave 4,455,000 red cells and 10,000 white corpuscles in place of 3,350,000 red and 16,000 white cells on admission. The reduction in the red cells, which disappeared after santonin treatment, could only be attributed to the absorption of the toxins of the Ascaris worms, as there were no signs of other recognized cause, *e.g.*, tuberculosis, syphilis or malaria.

R. T. L.

Amaral (Afrânio). **Filariose de Bancroft.** [Bancroft's Filariasis.]—*Mem. Inst. de Butantan.* São Paulo. 1918–19. Vol. 1. No. 2. pp. 89–166. With 16 plates. [English summary, p. 161.]

From the author's summary in English one gathers that the following are the chief points of interest in this long and well illustrated paper. The filariasis due to *F. bancrofti* is endemic in Brazil, chiefly in the northern and central states. In Bahia the filarial index is about 9 per cent. Periodicity is probably "a factor of a larger nightly issue of toxin by the adult worm. The embryos in the blood are agglomerated by the extremity of the tail by means of hydrohemolysis." Morphologically the embryos can be differentiated from all other embryos of filariae by the presence of a central viscus. "The inflammatory and obliterating lesions of filariasis are determined by the presence of the

adult parasites in the lymphatic system, by their eggs, and may be on a larger scale through their own toxic products." Mechanical causes favour the stagnation and extravasation of lymph, which, continuing to form in the tissues, increases the pressure of the lymphatic "vases," thus complicating the lesions of the disease. Besides inflammatory forms of the disease, there are reasons for including anaphylactic manifestation, *e.g.*, pernicious lymphangitis. The adult worms may cause abscesses. Elephantiasis may be produced exclusively by the *Filaria bancrofti*. There are grounds for distinguishing a form of lymphatic extravasation and one of chylous extravasation. Filariasis has a haematology characteristic of (*a*) the apyretic period—reduction of neutrophile polymorphonuclear leucocytes, with an increase of the micro-lymphocytes at night and an increase in the eosinophiles. (*b*) an absolute increase in the leucocytes, an increase of the neutrophile polymorphonuclear leucocytes, with reduction of the micro-lymphocytes and a diminution or absence of the eosinophiles, which return before the access of fever has passed.

Surgery may radically cure certain very old and troublesome results of Bancroft's filariasis, but the best therapeutic treatment for such parasitation seems to be radio-therapy.

R. T. L.

Tanon (L.) & Giraud. **Traitement des filarioses sanguines par les injections sous-cutanées d'hectine.**—*Rev. Méd. et Hyg. Trop.* Vol. 12. No. 3. pp. 82–86.

Hectine, first tried by one of the authors in 1910, appears from further experience to be of real efficacy in the treatment of filarial infections, especially those due to *Filaria bancrofti*. It has certain advantages over tartar emetic and other preparations, *e.g.*, those of iodine. It is easy to use and is quite harmless. It results in cure. at least in some cases observed by the authors. In three cases quoted the hectine was given by the same method as in syphilis, *i.e.*, an injection of 0·2 cgm. under the skin of the arm every second day for a period of 20 days. After an interval of 10 days a second series of injections follow. A third series is given after a similar interval. To complete the course of treatment, after a month has intervened, two further series of injections are given in the course of a month. After the third injection the general health of the patient is much improved. The eosinophilia vanishes and the blood count becomes normal after two or three months. Fever and other symptoms entirely disappear. In elephantiasis, massage and bandaging, with electrical treatment and possibly the use of fibrolysin may be necessary.

R. T. L.

Low (George C.) & O'Driscoll (Elizabeth J.). **Further Researches upon Antimony in the Treatment of Filariasis.**—*Lancet.* 1921. Jan. 29. pp. 221–222.

To a single case previously published by Low and Gregg, the authors add two further cases in which 17½ gr. of tartar emetic injected intravenously over a period had no effect whatsoever on the number of embryos circulating in the blood. The details of the blood analysis are carefully tabulated, and in one of the cases it is pointed out that there was an almost complete disappearance of the embryos from

the blood when no treatment was being given. At this time there was no lymphangitis, and the embryos reappeared after four days. Emetine, which was given for a concurrent amoebic infection, was similarly without effect on the filaria embryos. The total amount of tartar emetic given was 31 gr. in one case and 18 gr. in the second.

R. T. L.

Charles (E.). **Removal of Filaria from under the Conjunctiva.**— *Indian Med. Gaz.* 1920. Oct. Vol. 55. No. 10. p. 378.
Sewell (R. S.). **Note on Mr. Charles' Specimen.**— *Ibid.*

Under cocaine a worm was removed from "a fairly large swelling on the inner and lower side of the right eye beneath the ocular conjunctiva" in a native of Sialkot district near Jammu State Territory, India. The swelling followed the onset of pain of a neuralgic type which subsided at night when it was cold and increased in the daytime. Major Sewell reports that the preserved specimen, measuring 33 cm. in length and 2 mm. wide, was a female Filaria, in all probability of the species *F. conjunctivae* Addario.

R. T. L.

Macfie (J. W. S.). **Tartar Emetic in Guinea-Worm Infections.**— *Ann. Trop. Med. & Parasit.* 1920. Nov. 27. Vol. 14. No. 2. pp. 137–146. With 1 chart in text and 1 plate.

To the note of 10 cases of guinea-worm treated with tartar emetic which the author published earlier in 1920 some further observations have been added, and details of a few new cases are given which bring the total number of cases recorded up to 23 and the number of worms to 39. The paper also summarizes the results. Excepting on rare occasions the tartar emetic was administered intravenously in doses of 1 gr. every other day. The effect of the injection was to kill the adult worms and the embryos within them. The effect of the drug varies: most frequently the worms remain in the body and are gradually absorbed; in other cases the worm appears in the wound it has previously made, when it can be extracted easily, or portions may slough before the wound is healed. The effect of the drug in reducing inflammation is very notable. The inflammation of the affected limb and the discharge from the guinea-worm sore appear to respond immediately to the intravenous injections. There is undoubtedly a reduction in the duration of the illness and the liability to more serious consequences which attends other forms of treatment. In many cases 4 gr. in all suffices to kill the worms and the embryos. The author advises a total dose of 6 gr., as all guinea-worms are not equally susceptible.

R. T. L.

Hookworm Campaigns (1918).*

Salvador (1918). †

Hookworm relief measures were carried on in the Departments of San Salvador, La Paz, Cascatlan, La Libertad, Sonsonate, Santa Ana and Ahuachapan. At the central office in San Salvador city

* For 1917 see this *Bulletin*, Vol. 14, pp. 165–178.
† Report (No. 7,457) on Work for the Relief and Control of Hookworm Disease in Salvador, by Dr. C. A. Bailey.

many school children, amongst others, were examined and treated as the result of an order of the Minister of Public Instruction which directed that all school children should present a certificate from the Department of Uncinariasis showing freedom from hookworm disease before being admitted to school. The strictly intensive plan followed during the previous two years was modified in the operations conducted in 1918. Specimen containers were distributed and treatment administered at the laboratories only. By this revised method the Department of Uncinariasis, without enlarging the field force, examined more than two and a half times and treated more than three times as many persons in 1918 as in 1917. The virulent influenza epidemic in Salvador towards the end of 1918 was a retarding factor in the work of the year.

Anthelmintics used were chenopodium and thymol. The opinion is expressed that chenopodium is preferable, as it is more readily taken. The bulk of the drug, when encapsulated, is much smaller, it does not produce as severe a reaction, and it has secured a somewhat higher percentage of cures with two treatments ; further, a first treatment with chenopodium preceded by a strong purge expels a larger number of Ascaris than a similar treatment with thymol—a strong consideration in inducing the people to undergo prolonged treatment.

Other Parasites.—Of the 67,787 persons examined in areas completed from the beginning of the work in 1916 up to the end of December 1918, 73·8 per cent. were found to harbour Ascaris, 39·5 per cent. Trichocephalus, and 1·6 per cent. Strongyloides. Taenia (species undefined) occurred in 1·2 per cent. In addition 301 persons were found infected with Oxyuris. These figures are not intended to give an accurate index of the relative incidence of infection, as thorough examinations were made for hookworm only.

Sanitation.—The National Sanitary Code provides ordinances for the construction, maintenance and proper use of latrines, but unfortunately the ordinances are not enforced. A sanitary survey begun in all the towns where work has been conducted showed that of 14,964 homes inspected, 1,041 had latrine accommodation on first inspection, which was made at the time curative work was in progress in the various areas. At the time of the second inspection, made in the course of the 1918 sanitary survey, 3,506 homes were found to have latrine accommodation.

Panama (1918). ‡

The work is under the medical direction of Dr. W. T. Burres, but during his absence for the greater part of the year Dr. J. L. Rice personally supervised the campaign. During 1918 operations were completed in Dolga and Boquete districts of the provinces of Chiriqui, in Macaracas, Poeri, Las Tablas, Pedazi and Los Santos districts of the province of Los Santos, and at the Red Cross Clinic in Panama city. The district of David, where work had been closed in 1916, was reopened in 1918 because patients belonging to that district constantly appeared at the laboratories of surrounding districts in search of treatment, which they had previously declined. A preliminary survey

‡ Report (No. 7,466) on Work for the Relief and Control of Hookworm Disease in Panama, by Dr. W. T. Burres.

was also made early in the year in the five principal towns of the province of Veraguas, viz., Atalaya, Santiago, San Francisco, La Mesa and Rio de Jesus.

Mode of Campaign.—The Department of Uncinariasis conducts all work of examination and treatment according to the dispensary method. This method has been adhered to throughout Panama as best suited to meet the social and topographical conditions of the country. The persons examined, in areas completed during 1918, numbered 16,185, of which 84·4 per cent were found infected. First treatment was administered to 87·6 per cent. of those infected, and of those treated 35·8 per cent. were pronounced cured upon microscopical re-examination.

Anthelmintics.—Both thymol and chenopodium were used during 1918. The dosage of thymol was 3 gr. for each year of age up to a maximum of 60 gr. This dose was given in two equal parts, with an interval of two hours. There was a preliminary purge of magnesium sulphate, and a second purge was given two hours after the second portion of thymol. The dose of oil of chenopodium was reduced to 30 minims, and this was administered only to fairly robust adults. As with thymol, this dose was given in two equal parts, with an interval of two hours between the doses.

Other Parasites.—Of the 93,286 persons examined for hookworm between 1914 and 1918, Ascaris infection was detected in 40·1 per cent., Trichocephalus in 20·2 per cent., and Strongyloides in 2·7 per cent. Taenia (spec. indet.) in 203 cases, and Oxyuris in 126 cases were also noted.

Haemoglobin Index.—The results of 9,297 haemoglobin examinations made during 1918 show an index of 58 per cent.

Sanitary Improvement.—The spirit of indifference with which the people of the small towns and the rural areas of Panama meet all efforts toward sanitary reform in their communities has greatly hindered progress in this branch of the work. The type of public latrine now being installed in Panama is a concrete structure of the cement-lined pit variety. This is practicallly indestructible, and is so constructed that it can be converted at any time into the septic tank or the flush variety of latrine without moving the house or destroying the pit.

Census		
Examined..		16,185
Found infected	(84·4%)	13,656
Given first treatment	(87·6%)	11,966
Cured	(35·8%)	4,286

Nicaragua (1918).*

In the following areas intensive work was completed during 1918: Nandasmo, Catarina, Niquinohomo, San Juan and Mazatepe of the Department of Masaya; and Boaco, La Libertad, San Lorenzo Juigalpa, Teustepe, Santo Domingo, Santa Lucia, San José Remalis, and the Babilonia and Esmeralda mines, all situated in the Department of Chontales. In several areas the straining of stools formed an important part of the educational campaign. As many as 4,000 worms were obtained from a single individual, and in highly-infected cases

* Report (No. 7,465) on the Work for the Relief and Control of Hookworm Disease in Nicaragua, by Dr. D. M. Molloy.

it was not unusual to collect from 750 to 1,000 worms after a single treatment. The demonstration of these heavily-infested stools was of inestimable value as educational propaganda. In rural districts it is difficult to get the average inhabitant to submit a specimen for examination, and as practically the only non-infected persons in such areas are the very young and the very old, treatment could profitably be administered to all who present themselves. After four treatments, the maximum number usually necessary to effect a cure, a patient could, for campaign purposes, be considered hookworm-free.

Summary of Results.—In the areas completed during 1918 the number of persons examined was 19,786. Of these 75·9 per cent. were found infected, and first treatment was administered to 91·1 per cent. of those found infected.

Anthelmintics used.—A mixed treatment, consisting of 60 gr. of betanaphthol and 20 gr. of thymol was used almost exclusively throughout the greater part of the year. The former drug was given in two equal parts with an hour's interval between the doses and the latter drug in one dose an hour later. Very satisfactory results are reported from the use of this combination. Chenopodium in freshly-filled capsules proved more efficacious than when administered unencapsuled in combination with sugar. In one laboratory it was found that an addition of 25 per cent. by volume of chloroform appreciably increased the efficacy of the chenopodium. The dosage for an adult patient consisted of 30 minims of chenopodium and 7½ minims of chloroform ; for children the dose was graduated according to age.

Other Parasites.—Of the 19,786 persons examined for hookworm, 79·4 per cent. were found infected with Ascaris, 54·5 per cent. with Trichocephalus, and 3·4 per cent. with Oxyuris. In addition 243 persons harboured Strongyloides, and Taenia was detected in 145 persons.

Latrines.—In all areas the latrines installed were of the pit-type, provided with a stone or cement curb reaching about 5 ft. below the surface of the ground and serving as a foundation for the building. The depth of the pit is as great as conditions permit, varying from 6 ft. in the low ground to 20 or 30 ft. in high ground. Where a shallow pit is necessary the other dimensions are increased proportionately and the curbing is built from the bottom of the pit and is carried 2 or 3 ft. above the surrounding surface. A mound of earth sloping outwards to a distance of 15–20 ft. is built around the curbing, and a circular ditch is dug two or three yards distant from the circumference of the mound.

St. Lucia (1918).*

Measures for the control and relief of hookworm continued during 1918 under Dr. Stanley Branch under the supervision of an Advisory Board having the same personnel as the Board of Health of the colony. Prior to 1918 intensive operations were completed in the Cul-de-Sac Valley, the Castries Valley, and the Union Girard areas.

During the first half of 1918 the campaign spread northwards and ultimately enveloped the remaining 12½ square miles at the western end of the island. The Gros Islet area was completed on April 30. Towards the end of February operations were also begun in the

* Report (No. 7,443) on Work for the Relief and Control of Hookworm Disease in St. Lucia, by Dr. Stanley Branch.

"Roseau-Raye-Millet" area, which covers about 17 square miles of territory, and embraces three well-marked valleys—Roseau, Millet, and Anse la Raye. This was terminated on December 31.

Infection with Other Parasites.—Of 5,004 persons examined for hookworm during 1918, Ascaris infection was noted in 33·6 per cent., Trichocephalus in 5 per cent., and Strongyloides in 3·5 per cent.

The chief *anthelmintics* used during these campaigns was thymol in 10-gr. capsules, and the dose was increased to a routine of 50 gr., or even 60 gr. for adults. In and around the village of Gros Islet oil of chenopodium was used exclusively because of the greater prevalence of round-worms in the village. With the chenopodium 72 per cent. of the cures eventually recorded were effected after one treatment, while thymol was effective to a similar degree in 67·7 per cent. of the cases eventually cured.

Sanitation.—It is stated that "it will require years of hard educational effort to overcome the natural instinct of the inhabitants of St. Lucia to defaecate wherever inclined." Gros Islet village has two latrines built over the sea. They are kept clean and in good condition, and are used exclusively by males of all ages. The pails, or "pots de chambre," used in the houses are carried down to the beach at night, and at an appointed spot are emptied and cleaned. Dirty utensils are kept in or under the living rooms until they are emptied. There are no pit latrines in the village, and only a few out-buildings of the pail type. Apart from the village there are 140 inhabited houses in Gros Islet area. The sanitary conditions at Roseau during 1917 were unspeakably bad, but there was improvement during the following year. Fifty-five new portable latrines were erected for the various settlements. The village of Anse la Raye has two public latrines erected over the sea, and these are used exclusively by males. The beach is the common latrine. The school latrine is a considerable distance from the school and has no accommodation for boys. Although erected in July it had not once been used up to December. Earth closets are furnished by the colony for free distribution among the peasantry.

Census		5,036
Examined	(99·4%)	5,004
Found infected	(62·5%)	3,126
Given first treatment	(92·5%)	2,892
Cured	(71·5%)	2,068
Removed from area (or dead)	(6·8%)	212
Remaining in area uncured	(27·1%)	846
(*a*) unclassified	(4·2%)	131
(*b*) refused	(13·5%)	423
(*c*) medical reasons	(1·0%)	31
(*d*) under treatment	(8·3%)	261

St Vincent (1918).*

Prior to 1918 the work of examination and treatment had been completed in all the inhabited territory on the eastern and southern coasts of the island. This embraced nine areas: Calliaqua, Belair, Zion Hill, Stubbs, Mesopotamia, Biabou, New Grounds, Colonarie, and Georgetown, where operations were conducted by the intensive method, and one—a sparsely-settled stretch of land between the Dry

* Report (No. 7,424) on Work for the Relief and Control of Hookworm Disease in St. Vincent, by Dr. P. B. GARDNER.

river and the northernmost point of the island—where the work was done by the dispensary method, and the people were invited to visit the office in Georgetown for examination and treatment. During the early months of 1918 the Medical Officer in Charge was on leave, but on May 11, 1918, work was reopened in the Lowman's district in the south-western part of the island. This district includes two large villages, Lowman's and Camden Park, and a large number of scattered homes. The work was completed in August 1918, and the campaign in St. Vincent was then indefinitely suspended.

Infection with other Parasites.—Of 21,430 persons examined up to December 1918, 91 per cent. harboured Ascaris, 73·4 per cent. Trichocephalus, and 10·6 per cent. Strongyloides. One person only was found with Taenia (sp. unidentified).

Latrine accommodation was found in only 20 of the 241 homes surveyed in the Lowman's district. During May and June a "re-infection survey" was made of persons cured in the earlier stages of the campaign. The original campaigns were completed in the Calliaqua district on September 30, 1915, in the Belair district on December 31, 1915, and in the Sion Hill district on April 5, 1916, all more than two years previously. Of 2,257 persons cured in these three districts, 1,525 or 67·6 per cent. were re-examined. Of these 60·5 per cent. were found to have become reinfected. The percentages ranged from 46·9 per cent. in the Belair area to 68·2 per cent. in the Sion Hill area. The degree of infection found in these areas at the time of the original surveys was: Calliaqua 31·5 per cent., Belair 68·5 per cent., Sion Hill 60·4 per cent. These figures are attributable to failure to use latrines where provided and inadequate provision for the disposal of excreta and maintenance of latrines. In view of these results it was deemed inadvisable to continue work in St. Vincent until such time as the Government could organize a sanitary force to deal effectively with the problem of soil pollution.

Census		1,121
Examined		1,117
Found infected		955
Given first treatment	(92·6%)	884
Cured		766
Percentage of infected cured	(80·2%)	
Percentage of treated cured	(86·7%)	
Removed from area	(3·4%)	32
Remaining in area uncured	(16·4%)	157
(*a*) Not located	(0·1%)	1
(*b*) Refused	(4·4%)	42
(*c*) Medical reasons	(5·5%)	53
(*d*) Under treatment	(6·4%)	61

Trinidad (1918).*

During 1918 intensive operations were completed in the San Juan, Santa Cruz, Maracas, Laventille and Caroni areas, and in the Boys' Reformatory at Diego Martin.

Treatment.—Thymol finely powdered and mixed with an equal quantity of sodium bicarbonate and given in gelatin capsules in two equal doses, one at 6 a.m. and one at 8 a.m. The total amount usually given to an adult in the first treatment is 40 gr. of thymol.

* Report (No. 7,426) on Work for the Relief and Control of Hookworm Disease in Trinidad, by Dr. G. C. Payne.

This is increased or diminished in subsequent treatments as indicated by the minor toxic symptoms shown by the patient. A purge of magnesium sulphate is given the evening before treatment, and a similar purge two hours after the second dose of thymol.

Oil of chenopodium in small doses is used in the treatment of small children in preference to thymol because it admits of a simpler technique of administration, and it is efficacious in expelling *Ascaris lumbricoides*. At 6 a.m. one minim for each year of apparent age is administered in a hard gelatin capsule with ½ oz. of castor oil. If the child is unable to swallow the capsule the chenopodium is put in the castor oil and a little simple syrup is given afterwards. The taste of the castor oil is disguised by oil of peppermint. A further purgation is only given if the castor oil fails. To adults complaining of dysentery, active or latent, 15 minims of chenopodium were given, with 1 oz. of castor oil or corresponding dose of magnesium sulphate.

Of the 40,482 persons examined for hookworm in areas completed during the period from the beginning of the intensive work up to December 31, 1918, no less than 13,281, or 32·8 per cent., were found infected with Ascaris, 11,956, or 29·5 per cent., with Trichocephalus, and 2,705, or 6·7 per cent., with Strongyloides. In addition, 134 persons were found to harbour Oxyuris and 11 Taenia [species not stated]. The race incidence was as follows: East Indian, 87·1 per cent.; Black, 68·7 per cent.; Creole, 66·2 per cent.; White, 30·5 per cent.; Yellow, 61·8 per cent.; Red, 95·7 per cent.; unclassified, 69·6 per cent. The infection rate under six years was 45·5 per cent., while that of all ages over six years remained fairly constant between 75 and 80 per cent.

The type of latrine most generally used in the villages of Trinidad has a pit from 3 to 10 ft. deep and a very frail superstructure. This is not well suited to flat land where the ground water is close to the surface, but as yet no suitable substitute has been devised. Other types are too expensive in first cost and require too much attention to keep them in sanitary condition.

Census		13,672
Examined		13,474
Found infected		10,828
Given first treatment		10,106
Cured		7,846
Percentage of infected cured	(72·5%)	
Percentage of treated cured	(77·6%)	
Removed from area (or dead)	(5·4%)	589
Remaining in area uncured	(22·1%)	2,393
(*a*) Not located	(0·4%)	48
(*b*) Refused	(9·6%)	1,042
(*c*) Medical reasons	(5·0%)	544
(*d*) Under treatment	(7·0%)	759

British Guiana (1918).*

Intensive operations were completed in five artificially defined areas of the Essequebo district and in the Onderneeming Industrial School—a Government institution. Some special experimental work was completed on the Anna Regina sugar plantation. The populated section of Essequebo is limited to a narrow strip along the public road.

* Report (No. 7,442) on Work for the Relief and Control of Hookworm Disease in British Guiana, by Dr. F. W. Dershimer.

The inhabitants are an agricultural people. The soil in the greater part of this district differs from that of the other sections of British Guiana where work has been conducted. Here it is of the sandy, moisture-holding type so favourable to the development of hookworm ova. It is noteworthy that the percentage of infection greatly exceeds that of the other districts in which the soil was almost entirely of clay.

A trial of the technique described by Capt. BARBER, U.S. Army, was made on specimens already pronounced as positive. In some cases the results were excellent, from 10 to 20 times as many eggs being found on one slide as were counted on an ordinary smear, but with others the results were very poor. It was concluded that the Barber method is not reliable.

Thymol was used with sodium bicarbonate as a diluent. The average dose was increased until healthy adults received 60 gr. and children proportionately. No ill effects resulted, but no appreciable increase in the percentage of cures was obtained.

Of the 11,719 persons examined for hookworm, 3,428, or 29·3 per cent., were found to be infected with Ascaris, 2,009, or 17·1 per cent., with Trichocephalus, and 536, or 4·6 per cent., with Strongyloides. These figures do not represent a complete index of infection as a thorough examination was made only for bookworm ova.

The percentage of hookworm infections of the various age groups in the Essequebo district is as follows :—

Under 6 years	.. .. ..	29·2% of	1,621 examined.
6–18 years	.. .. ..	79·5% ,,	3,360 ,,
19–40 ,,	.. .. ..	84·4% ,,	4,553 ,,
41–60 ,,	.. .. ..	80·7% ,,	1,776 ,,
Over 60 ,,	.. .. ..	74·6% ,,	409 ,,
All ages ..	.. .. ..	74·5% ,,	11,719 ,,

Sanitary Improvement.—Of the 3,245 homes inspected in the Essequebo district during the progress of the campaign, 48·3 per cent. had latrine accommodation at the time of the first inspection, and 59·2 per cent. of the houses were so provided at the last inspection. The pit latrine is the type which the Government officers require to be erected in the country.

It was noticed that 95·8 per cent. of the inmates of the Onderneeming Industrial School harboured hookworms. The pail system was in use at this Institution, and the contents were buried about 2 ft. deep in sandy ground around lime trees. Soil from the surface showed innumerable larvae, showing that probably pit latrines in such soil are not efficient. The Demerara Bauxite Co. continued to maintain and improve the sanitation of its settlements up the Demerara river according to the scheme adopted in 1917. The manager of this company states that the efficiency of his men has been increased from 25 to 50 per cent. from the sanitary and health work carried on in their behalf during 1917 and 1918.

Finance.—The cost per person treated, based on the 39,901 persons treated, was $1·91, and the cost per person cured, based on 32,230 persons cured, was $2·36.

Technique.—In order to test the efficiency of the centrifuge, specimens sufficient to give 1,000 positives were examined without using it and the number of slide on which the ova were found was noted. Centrifuged preparations of these specimens were then examined and note was again made of the number of the slide on which ova were

discovered. The percentage of positives found on first and second slides after centrifuging were practically the same as those found on the corresponding direct smear slides, with a slight advantage in favour of those not centrifuged. The percentage found on the third slide in the centrifuge technique was, however, slightly larger than on the corresponding slide in the plain smear technique, so that the results as a whole appear to have been approximately the same with both methods. This is attributed to the training of the microscopists employed. With average help the centrifuge technique is said to show from 12 to 23 per cent. more positive cases than the direct smear method alone.

Census (Essequebo District)		11,856
Examined	(98·8%)	11,719
Found infected	(74·5%)	8,727
Given first treatment	(93·7%)	8,175
Cured		6,871
Percentage of infected cured	(78·7%)	
Percentage of treated cured	(	
Removed from area (or dead)	(6·5%)	565
Remaining in area uncured	(14·8%)	1,291
(*a*) Not located		4
(*b*) Refused	(2·4%)	210
(*c*) Medical reasons	(6·2%)	543
(*d*) Under treatment	(6·1%)	534

Brazil (1918).*

During the year 1918 the work of the Department of Uncinariasis was greatly extended. In the Federal District the intensive post in the town of Zumby completed its task on the Ilha do Governador in the Bay of Rio de Janeiro and was transferred to the District of Jacarepagua. In the state of Sao Paulo an intensive demonstration was completed in the municipio of Guarulhos, near the city of Sao Paulo. The post was then transferred to the municipio of Brodowski, in the coffee region, and a new intensive post was established in Atibaia. In the state of Rio de Janeiro a second intensive post was founded in the municipio of Campos, the centre of the sugar industry. In the state of Minas Geraes a survey was begun and a small post was established at the capital for the examination of school children. In addition a number of posts were maintained entirely by state funds, but an extraordinary number of national calamities affected the prosperity of Brazil during 1918, which interrupted and postponed the commencement of the work. The Laboratory of Hygiene of the Medical Faculty of the University of Sao Paulo co-operated by conducting malaria surveys in areas selected for intensive hookworm campaigns. Worm-counts were also made by the laboratory on 280 cases. These persons expelled a total of 29,029 worms, or an average of 103·6 worms per case. The average in the case of town dwellers of this group was well below 50, whereas agricultural labourers showed averages running from 55 to 233. In over 20,000 worms identified in the laboratory count, the ratio of Necator to Ancylostoma was 43 to 1. The comparative anthelmintic value of oil of chenopodium and thymol was also investigated by means of worm-counts. It was found that 46 per cent. of 138 cases were cured by two treatments of oil of

* Report (No. 7,469) on Work for the Relief and Control of Hookworm Diseaes in Brazil, by Dr. L. W. Hackett.

chenopodium administered 10 days apart (each treatment consisting of 1·5 mil of the drug given in three equal parts). The two doses expelled 97 per cent. of all the hookworms harboured and 98 per cent. of the Necator variety. Over 90 per cent. of the worms were expelled after the first dose. It is thus shown that the percentage of cures obtained with a given vermifuge is not an adequate criterion for determining the efficiency of the drug. On the basis of microscopic returns of persons cured, the efficiency of the routine treatment appears to be less than 50 per cent., but when accurately evaluated in terms of parasites expelled it is seen to be more than 97 per cent.

The inaccuracy of reports of infection and cure based on microscopic findings was revealed by worm-counts made on a number of cases reported negative or cured after thorough routine microscopical examination. On one farm in Sao Paulo 21 of the 71 inhabitants were reported negative upon microscopical examination of stools. All negatives were then treated with a single large dose of chenopodium and 191 worms were removed. Only six of the 21 were actually free of hookworms. Although the stool examinations were carefully done by three practised microscopists, over 70 per cent. of the negative cases were inaccurately diagnosed. When infection averaged less than 15 worms, microscopy failed to give a correct diagnosis in 52 per cent. of the cases examined, despite the fact that at least four slides were searched in each case, two before, and two after centrifuging.

	Ilha do Governador Federal District.			Municipio of Guarulhos, State of Sao Paulo.		
Census	—	7,062		—	4,088	
Examined	—	6,636		—	3,854	
Found infected	—	4,724		—	2,198	
Given first treatment	—	3,922		—	1,972	
Cured	—	2,736		—	1,371	
Percentage of infected cured	(57·9%)	—		(62·0%)	—	
Percentage of treated cured	—	—		(69·5%)	—	
Removed from area (or died)	(6·4%)	302		(10·4%)	228	
Remaining in area uncured	(35·7%)	1,686		(27·3%)	599	
(*a*) Not located	(0·7%)	35		(1·0%)	21	
(*b*) Refused	(21·7%)	1,027		(12·4%)	273	
(*c*) Medical reasons	(4·7%)	222		(4·9%)	107	
(*d*) Under treatment	(8·5%)	402		(9·0%)	198	

Seychelles (1918).*

The work begun in the Mount Fleuri area was continued during 1918 and extended to north Mahe, when the completion of operations brought the campaign in the island of Mahe to a close. In the last month the work was begun in the island of Praslin, the next largest of the Seychelles group. This work is still in progress. The whole area of north Mahe, including a large part of the town of Victoria, is extensively shaded by coconut palms. The hookworm infection-rate was found to be lower than in central and southern Mahe, and this is attributed to the better sanitary accommodation. In the outlying portions of the area the inhabitants own or rent small plots of land on which they grow coconuts, bananas, maize, sweet potatoes and manico. The campaign during 1918 was conducted mainly on the intensive plan.

* Report (No. 7,444) on Work for the Relief and Control of Hookworm Disease in Seychelles, by Dr. J. F. Kendrick.

Anthelmintics used were thymol and chenopodium. When thymol was used it was finely powdered, mixed with equal parts of milk-sugar, and administered in gelatin capsules in two equal doses. The maximum adult dose for robust men was 60 gr., the maximum dose for women 40 gr. Magnesium sulphate was given as a purge on the evening before treatment, and again two hours after the second dose of thymol. The chenopodium was administered in freshly-prepared gelatin capsules, except when given to children, when it was dropped on sugar. The maximum dose for men was 30 minims, for women 24 minims, and this was divided into equal portions administered with an interval of two hours. Magnesium sulphate was used before and after treatment as in the administration of thymol. A variation of the routine was employed in a part of north Mahe. The full daily dose of the chenopodium was placed in castor oil and given at 6 a.m. No purge was given before this treatment. Examinations were made seven and 14 days later. The second re-examination revealed the fact that no less than 5 per cent. of those reported cured on the first re-examination still harboured the parasite. These "false cures" were not experienced among the patients treated by the usual method.

Other Parasites.—Of the 18,058 persons examined in all areas from the commencement of the work in 1917 to the end of 1918, 70·3 per cent. were found to harbour Ascaris, 94·3 per cent. Trichocephalus, and 2·7 per cent. Strongyloides. Three persons were seen to have Oxyuris.

Racial Incidence.—Of the 18,058 persons examined, 15,575, or 86·27 per cent., were blacks, and 92·27 per cent. of these had infection; 2,483 were whites, and 83 per cent. were infected. The age incidence showed a constant rate of all persons over six years of age.

Sanitation.—The law provides for the construction of pit latrines in the country, and pail latrines in the town of Victoria. Practically every home throughout the island of Mahe has its pit latrine, but in the town the pail latrine has been found to be too expensive for each family to maintain, and the use and cost of maintenance is often shared by two or three families. The excrement in Victoria is collected at night and hauled in carts to coconut estates, where it is deposited in freshly prepared trenches and covered with 3 or 4 ft. of earth.

Queensland (1918).*

The hookworm campaign in Queensland was inaugurated in April, 1918, and was carried out, under the direction of Dr. J. H. Waite, in an area of 260 miles of coastal country reaching from Cooktown to Townsville and embracing a population of 14,137 persons. Within this area are six settlements, each accessible only by sea. In none of the districts worked by the intensive plan were operations completed by the end of the year [and the statistics are therefore withheld in this summary].

Queensland has an area of 670,500 square miles, and 53 per cent. of its territory lies within the tropics. The great dividing range five to 100 miles inland from the Pacific coast and parallel to it divides the state into a wet, narrow coast belt and a dry expansive interior.

* Report (No. 7,455) on Work for the Relief and Control of Hookworm Disease in Queensland, by Dr. J. H. Waite.

The population, essentially of British stock with a small intermingling of Italians, Slavs, Chinese and Australian aborigines, has an average density of one person to the square mile, although the bulk of the people are found in the coastal districts. The rapidly disappearing aborigines now number about 16,000, of whom 5,000 are serving the white settlers. The chief industries are sugar in the coastal belt, metal and coal mining in the hill country, and farming in the interior. 11,678 persons were examined during 1918 and 22·5 per cent. were found to harbour hookworm. The sugar-growing spheres of Johnstone, Cairns, and Hinchinbrook show infection rates of 24·7 per cent., 25·2 per cent., and 32·1 per cent. respectively. There is no scavenging service, and the sanitary conveniences are wretched. In the townships of Cooktown and Cairns only 10·8 per cent. and 17·7 per cent. of the populations are infected, as a consequence of safer latrines and scavenger services.

Other parasites, incidentally reported, found in the routine examinations of 14,577 persons for hookworm were few. Ascaris was seen only 18 times, Trichocephalus on 183 occasions, and Oxyuris on 75, Strongyloides in 19 and *Hymenolepis nana* in 51 persons. These figures, it is stated, do not present an accurate index of relative infection.

Infection varies greatly with race. British stock shows 18·9 per cent., Italians 43·9 per cent., Chinese 5·5 per cent., and aborigines 75·9 per cent. The Italians and aborigines not only show utter carelessness in sanitary matters, but have also the habit of going without shoes. Like negro races in other parts of the world, the aborigines seem to possess a relative immunity toward the ill effects of hookworm infection and are of importance chiefly as distributors of disease. The infection rate for persons between six and 18 years old was 40 per cent., and probably results from the barefoot habit among the children in Queensland. In the Townsville school-children the infection rate was very light, viz., 7·5 per cent.

Sanitation.—The Queensland Health Act stipulates that pail latrines are to be used throughout the State and forbids the erection of pit latrines. The initial sanitary inspection throughout the districts mentioned above showed that of the 3,023 homes inspected, only 2·7 per cent. were without latrine accommodation of any kind, but that 93·5 per cent. had latrines of an insanitary type. In Cooktown and Cairns townships 82 per cent. were found to be sanitary on the last inspection, and there was marked progress in other districts. In some areas local authorities had hired a corps of carpenters, who were systematically remodelling all latrines.

Mental retardation averaging 5·4 months by Binet test and two months by Porteus was found to occur in lightly infected children, while averages of 19·5 months by Binet test and 13·3 months by Porteus was determined in heavily infected children.

R. T. L.

[The various Reports referred to in the footnotes are issued by the Rockefeller Foundation International Health Board, as lithographed Reports for limited distribution.—Ed.]

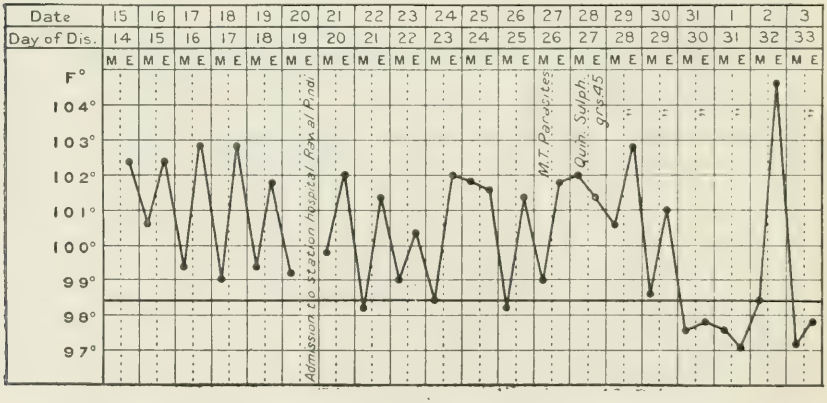
ENTERIC FEVERS IN THE TROPICS.

LARGE (D. T. M.). **Some Laboratory Work in Connexion with the Afghan War, 1919.**—*Jl. Roy. Army Med. Corps.* 1920. Nov. Vol. 35. No. 5. pp. 386–395. With 2 charts in text.

The section containing work done in investigating cases of "Enterica" extends from p. 389 to p. 392. Captain Large describes culture methods on Conradi's medium. Colonies showing no agglutination when placed on a slide were discarded. Difficulty was experienced in the hot weather with litmus; it deteriorated rapidly no matter from what source obtained, so much so that "in order to obtain a reliable result in the sugar tests, the addition of litmus to the sugar was given up altogether." Organisms were inoculated into "white" sugars and the litmus added after two or three days' incubation.

Two hundred and sixty-one Widal tests were done, each against *B. typhosus*, *paratyphosus* A and *paratyphosus* B. The important feature in Captain Large's work is that it shows the limitations of this test in the vaccinated individual. He gives the following example:

Sergt.-Major W., transferred from the frontier as a case of the enteric group, was admitted to hospital in Rawalpindi about the 19th day of disease, and his blood was sent for Widal test. *B. typhosus* was agglutinated 1 : 250, and, clinically, he seemed a case of typhoid fever. During a differential count of his blood, parasites of malignant tertian malaria were found; his temperature shows characteristic malaria.



Case of Subtertian Malaria in Enteric Inoculated Soldier.
(Reproduced by permission from the *Journal of the Royal Army Medical Corps.*)

Single agglutination tests are, therefore, of no value in those who have been inoculated, and in such cases a series of tests should be made at four-day intervals. Even the fact that agglutination occurs in tests so made, during a suspected attack of enteric fever, is not conclusive proof, unless there is a marked variation in the titre obtained. Thus, in an example quoted, rising agglutination to *B. typhosus* might be found;

but when the series of tests was carried on into convalescence, several cases showed a much more marked rise to *B. paratyphosus* A, pointing to that organism as the true cause of the fever (especially in India).

The following cases which occurred in this laboratory are instances in which the test was of value as an aid to the diagnosis of enteric group—

	First Widal			Second Widal			Third Widal			Fourth Widal		
	T	A	B	T	A	B	T	A	B	T	A	B
Pte. D. ..	125	250	—	250	250	—	500	250	—	800	250	—
Pte. F. ..	125	25	—	500	25	—	800	25	—	—	—	—
Sergt. H. ..	500	—	—	800	—	—	1,000	—	—	—	—	—
Pte. S. ..	100	—	—	250	—	—	500	—	—	—	—	—
Miss G. ..	125	125	—	250	250	—	125	500	—	—	—	—
Gnr. F. ..	125	50	—	50	125	—	25	500	—	25	2,000	—

while the next table gives cases in which the results were of no value for diagnosis of fresh enterica infection.

	First Widal			Second Widal			Third Widal			Fourth Widal			Diagnosis.
	T	A	B	T	A	B	T	A	B	T	A	B	
S. M. W.	250	—	—	125	—	—	—	—	—	—	—	—	Malaria.
Pte. U. ..	—	—	—	—	—	—	—	—	—	—	—	—	Typhoid Fever, *B. typhosus* found in blood.
Capt. R.	—	—	—	25	50	—	—	—	—	—	—	—	Enteric Group, clinically.
Gnr. G.	—	—	—	—	—	—	—	50	—	—	—	—	,, ,, ,,
Sergt. R.	—	—	—	—	—	—	—	—	—	—	—	—	,, ,, ,,
Lieut. G.	—	125	—	—	—	—	—	—	—	—	—	—	Malaria.

J. H. Tull Walsh.

LEDINGHAM (J. C. G.). **The Cultural Diagnosis of Enterica in Inoculated Individuals.**—*Lancet.* 1921. Jan. 8. pp. 72–74.

* The author refers to a view widely entertained in certain circles as the result of war experience especially in France, that protective inoculation renders diagnosis by blood culture impracticable and futile, the bacteriaemic phase, in infected persons previously inoculated, being presumably either non-existent or too transient to permit of successful attempts at blood culture. He adduces evidence from experience of American bacteriologists in France and from personal experience in the Mesopotamian zone that cases of enterica in inoculated individuals lend themselves as readily to blood culture as cases occurring in un-inoculated individuals. The author also questions the validity of

* This paper was noticed in No. 5 of Vol. 17. What appeared to be a summary of its contents was in reality an expression of the views of the Sectional Editor, and the author himself has furnished the summary now printed.—ED.

compiling enterica returns based largely on agglutination methods of diagnosis and of drawing hasty inferences with regard to the symptomatology of enterica as manifested in inoculated cases so diagnosed.

J. C. G. Ledingham.

In reference to the paper summarized in Vol. 17, No. 5, p. 408 of this *Bulletin* [BOURGES: Deux cas de septicémie éberthienne à type de fièvre intermittente.] Lt.-Col. W. P. MACARTHUR, R.A.M.C., writes as follows to the Sectional Editor :—

"I was interested to see your remarks in this month's *Tropical Bulletin* on the two cases of enteric fever of an intermittent type, and note that you consider there may have been an error in diagnosis. It might interest you to know that I had two similar cases while Special Sanitary Officer, Mauritius, 1911–14. The first was a civilian whom I saw in consultation with Dr. de Chazal, a well-known practitioner. This patient was governess to a family living in Vacoas, and had been in Mauritius only a couple of months or so when her illness commenced. From the temperature, Dr. de Chazal thought the infection might be malaria, though he was puzzled as to where the patient could have been infected, for Vacoas is malaria-free and the lady had not been away from that district (except during daylight) since her arrival. He examined her blood several times and found no parasites. I was asked to see the case, and made a blood culture, and, further, films. The latter showed no parasites, and *B. typhosus* grew out from the cultures. Amongst other tests, my routine then was to put such organisms through Lactose, Glucose, Saccharose, Maltose, Dulcite, Sorbite and Salicin. There was no doubt whatever as to the nature of the organism.

"The second case was a soldier running the same type of temperature. I used to do a blood culture and make films as a routine in every febrile case admitted to hospital, and in this case *B. typhosus* was isolated. No parasites were found, and, indeed, this man was from a malaria-free station.

"No Widal reaction was done in either case as both patients were treated with an autogenous vaccine which would vitiate any readings made, and, moreover, so far as the diagnosis was concerned, a Widal test was not required. Neither patient had been inoculated.

"I am sorry I cannot send you copies of their charts at present. Dr. de Chazal reported the lady's case to a meeting of the local Medical Society, and I gave him notes of the military case, which he also brought before the meeting. The charts and notes were published in the local Society's Medical Journal, and, no doubt, could be obtained if you would care to see them. The charts looked very like those in the Bulletin, but I don't remember either of the patients having shivers, as reported for the French cases."

W. P. MacArthur,

(Brev. Lt.-Col., R.A.M.C.)

MISCELLANEOUS.

BRUMPT. **Rapport au sujet d'une proposition du Dr. Jaworski, concernant la nomenclature zoologique, au nom de la Commission de la terminologie médicale, composée de MM. Chauffard, Clay, Roger et Brumpt, rapporteur.**—*Bull. Acad. Méd.* 1921. Mar. 1. Vol. 85. No. 9. pp. 254–257.

This is a criticism of certain proposals made to the Academy of Medicine of Paris by the "Commission internationale chargée de la revision des nomenclatures nosologiques" with the design of establishing some standard of uniformity of nomenclature for diseases due to infestation by parasites.

The proposals are: "(1) that the termination *osis* should be used for the designation of all diseases caused by a schizomycetes or a fungus, where the causal agent is known and is constant, *e.g.* tuberculosis, melitococcosis, typhosis, spirochaetosis, mycosis; and (2) that for all diseases provoked by an animal parasite the termination *iasis* should be employed, *e.g.*, trichiniasis, elephantiasis, phthiriasis, acariasis."

The critics, while allowing that these proposals have a plausible appearance of clarity, advance the following objections to them: (1) That pathogenic agents do not always correspond exactly with a morbid entity, since many different kinds of intestinal parasites give rise to similar clinical symptoms, and some parasites, such as the bacillus of tubercle and the spirochaete of syphilis, have divers pathological manifestations. (2) That names in the animal and vegetable kingdoms are, unfortunately, very far from immutable; they are subject to frequent correction, and to limitations and extensions of application, to the confusion of naturalists themselves, so that it would be too much to expect medical men to appreciate and follow these constant changes. (3) That generic names like "spirochaetosis" are capable of application to many different diseases; and that the exact position of the spirochaetes themselves in the scheme of classification is still in dispute. (4) That under the proposed terms elephantiasis might be interpreted as a pathological condition provoked by the elephant, etc.

The critics, while admitting that academic rules of nomenclature are not at all likely to meet with universal acceptance, and sympathizing with the view that a too rigid regard for the jots and tittles of such rules is an obstruction and a delusion, seem to express some approval of a method of nomenclature tentatively advanced by BLANCHARD and some of his associates, where, in order to express a pathological condition, the termination *iasis* would be employed for Greek *feminine* substantives and the termination *osis* for all others.

[This alternative nomenclature is open in an equal degree to the same objections that the authors themselves have advanced against the nomenclature proposed. "Elephantosis" would carry the same liability to grotesque misinterpretation as "Elephantiasis"; and "Spirochaetosis" must always stand for a general concept including numerous specific differentiae, even if—being compounded of two Greek feminines—it be changed to "Spirochaetiasis."

To the reviewer the proposals of the "Commission Internationale," if employed with common sense and with due regard to well-established claims and traditions, seem worthy of respectful consideration.

The Greeks themselves seem consistently to have used the termination *ιασις* for substantives denoting a morbid state having an association real or fancied with an animal. Thus, according to LIDDELL and SCOTT, *φθειρίασις* (*φθειρ*, a louse; *φθειριάω*, to be lousy) was used by ARISTOTLE to signify the morbid condition of lousiness; *ἐλεφαντίασις* (*ἐλέφας*, an elephant, and *ἐλεφαντιαω*, to have a skin like an elephant) was used by PLUTARCH to denote a morbid state of the skin resembling an elephant's hide in appearance; and *ψωρίασις* (*ψώρα*, itch or scab, and *ψωριάω*, to be itchy or scabby) was a word in general use for a morbid condition of itchiness or scabbiness. All these substantives, it will be noticed, are derived from their respective verbs by adding the termination *σις* (which denotes action in progress, or the result of action) to the inflectional stem—a recognised rule of etymology, not a matter of fancy.

To follow the Greek precedent of naming morbid conditions of animal association as if derived from verbs ending in *αω* therefore seems reasonable, and if any contrast be necessary the names of morbid conditions of bacterial and fungal association might be formed on the assumption that they are derived from verbs in *οω*.]

A. Alcock.

CORNWALL (J. W.). **Address to the Medical Research Section of the Indian Science Congress. The Organisation of Medical Research in India.**— *Indian Jl. Med. Res.* (Special Indian Science Congress Number. 1920. pp. 1–7.)

The author very rightly advocates the need of organisation in medical research: organisation of forces and appliances is indeed necessary for all successful enterprise. But in his scheme the author includes not only the appliances and machinery of research—laboratories, libraries, museums, catalogues of scientific literature, training schools, etc.—which it is not difficult to organize if the money be forthcoming but also the objects of the quest, which depend so much upon individual aptitude and individual enthusiasm, things of the spirit not quite so easy to organise. "Give me the spirit; what care I for the thews and bulk!" says Sir John Falstaff, who perhaps under-estimated the value of organised appliances for work.

The author is in favour of a State Department of Medical Research worked by a Director, subordinate to nobody, and a Council of six Heads of Laboratories, who would not only control all the means and machinery of research, but also decide annually the problems to be investigated. The author allows that individual inspirations must be allowed for and encouraged, but that is where the obstructions of a State Director subordinate to nobody begin. For history tells us that the inspirations of JENNER and PASTEUR and LISTER did not at their outset receive very much countenance from the directors of medical opinion of their time.

Again, on the not very pertinent ground that a man educated for the law does not in middle life become an architect, the author, while allowing that a medical man is none the worse for a working knowledge of all branches of science, does not approve of his going too far in any particular direction. He may make excursions into other provinces, but not long visits. Here, again, are puzzles for an omnipotent Director—to decide how far and how long an individual with inspirations of his own must be allowed and encouraged to go. We can hardly suppose

that by regulations of this kind a Pasteur, after achieving distinction as a chemist, would be permitted to make a lifelong voyage of exploration into undiscovered realms of microbiology, or that a Metchnikoff, having established himself as a zoologist, would be encouraged to investigate the arcana of pathology.

A. A.

Balfour (Andrew). **The Future of Research in Tropical Medicine: Facilities in Mauritius.** [Correspondence.]—*Brit. Med. Jl.* 1921. June 4. pp. 834–835.

Mauritius is recommended as a field for research. It is a quiet, peaceful place, and offers a variety of problems for investigation. The incidence of filariasis and the local insect carriers, the local molluscan host of *Schistosoma haematobium*, the insect locally responsible for spreading surra, the endemy of malaria and the anopheles hosts of the malaria parasite, the intestinal helminthic diseases—these are a few of the subjects that would repay attention. There is an excellent little laboratory eight miles from Port Louis, and the local representatives of the profession are keen.

A. A.

Sen (D. N.). [With Note by Major Gourlay]. **Auto-Haemic or Auto-Serum Therapy.**—*Indian Med. Gaz.* 1921. Mar. Vol. 56, No. 3. pp. 94–96.

What is here described as "auto-haemic" therapy consists in injecting into a patient, either into a vein or under his skin, some of his own blood. Six cases, including one of severe brachial neuritis, going on to paralysis and considerable atrophy of the arm, with a previous history of gonorrhoea and syphilis; two of acute gonorrhoea; one of disabling pain in the sacro-iliac joints, also with a previous history of gonorrhoea; one of extensive eczema accompanied with pain in the legs; and one of asthma—are here set forth and are described as either cured or benefited by this treatment.

A small amount of blood is drawn from the patient, is mixed with sterile, distilled water, and is then "subjected to certain laboratory processes, by which a solution containing the products derived from the splitting up of the highly specialized constituents of the blood is obtained." The treatment appears to consist in a course of five or more injections of this solution of blood, beginning with a dose of 1 cc. and increasing it to 5 cc., the course extending over about three weeks.

The author likens this treatment to auto-vaccination, and he gives a list of references to the literature of the subject. [He has not, however, included Metchnikoff's work on Immunity in his list; which is a pity, as the sixth chapter of that work throws a good deal of light on the phenomena in question and to a considerable extent justifies experimentation in therapy of the kind here described.]

A. A.

Camail & Cazanove. **Considérations sur la valeur physique des contingents indigènes recruités à Madagascar pendant la durée de la guerre.**—*Ann. de Méd. et de Pharm. Colon.* Paris. 1920. Dec. Vol. 18. pp. 8–46.

The greater part of this long paper consists of local statistics of recruitment, very valuable for the local archives, but not in this form

furnishing any general lessons for the world. A few pages deal with the sanitary condition of the recruits pending their embarkation. Besides the common diseases of the country—malaria and pneumonia—certain diseases seemed to be promoted or engendered by concentration or other circumstances of recruitment. At some centres there occurred epidemics of cerebro-spinal meningitis. Concentration also provided optimum conditions for venereal diseases and itch. Intractable sores and ulcers of the legs, often initiated by chigoes, furnish some terrible statistics; in the months June-September 1917, at Tamatave, from 13 to 24 per cent. of the mean strength was rendered ineffective by such sores and ulcers.

A. A.

Lasnet. **État sanitaire des troupes noires de l'armée du Rhin (troupes sénégalaises) pendant l'hiver 1919-20.**—*Ann. de Méd. et de Pharm. Colon.* Paris. 1920. Dec. Vol. 18. pp. 1–8.

An analytical estimate, from the sanitarian standpoint, of the capabilities of Senegal troops for service in a cold climate. The troops under observation formed a brigade of 5,637 men stationed at and about Mayence during the winter of 1919–20. They were lodged in good masonry barracks, were supplied with woollen underclothing and gloves, trench boots, and warm overcoats, and were well fed, receiving more meat and sugar and much more fat, but less bread, than Europeans, and no wine. The prevalent diseases were bronchitis and other affections of the respiratory system, more particularly in February than in the months of dry cold, and tuberculosis. The tuberculosis was of the reactionary lymphatic glandular type, as exhibited in children. Venereal disease was common enough, chiefly "blennorrhagia." On the whole morbidity was less than among European troops; but specific mortality was greater, in consequence, mainly, of the more acute course of pulmonary cases. The men were cheerful, "bon enfants" and fond of outdoor games. They were not averse to the pleasures of a social evening, but beneath a childish gaiety it would seem as if there always lay the wide landscape of the lordly Niger and the huts beneath the palm-trees.

A. A.

Orticoni (A.). **La lutte épidémique chez les réfugiés russes de Crimée à Constantinople en décembre 1920.**—*Bull. Soc. Path. Exot.* 1921. Mar. 9. Vol. 14. No. 3. pp. 187–194.

The author endeavours to articulate the appalling horrors that followed Wrangel's flight from the Crimea before the Bolsheviks. Shiploads of refugees, about 150,000 miserable souls, including not only the army and its sick and wounded, but also fleeing multitudes of civilians, arrived at Constantinople packed like cattle, sick and whole all together, and swarming with vermin. The author hints at the after-consequences in spreading disease among mankind. As a matter of fact, a few days after their arrival cases of typhus, relapsing fever, smallpox, cholera, plague and typhoid broke out among the refugees, those of relapsing fever almost amounting to an epidemic.

A. A.

Berkeley-Hill (Owen). **A Wassermann Survey of the Inmates of the Ranchi European Lunatic Asylum.**—*Indian Med. Gaz.* 1921. Mar. Vol. 56. No. 3. pp. 89–94.

The entire population of the Ranchi European Lunatic Asylum, which is fairly representative of the middle or lower-middle European and Eurasian elements of the population of Northern, Central, and Eastern India, has been examined, 186 individuals in all, by the Wassermann test : 73, or 39·24 per cent., reacted positively. This is a startling figure compared with that obtained by Hammond (*Amer. Jl. of Insanity*. 1913. July) in the New Jersey State Hospital, which was 2·7 per cent.

The author thinks the difference may be due to the facts that in the Ranchi statistics the number of examinations is few, that the cases had not received antisyphilitic treatment since admission, that they all came from an urban population, and that the community from which they came is very heavily infected with syphilis, as may be inferred from the huge percentage of unmarried women who are found to be sufferers.

The author tabulates his data, and considers that they support Hammond's argument that syphilis among the insane is not more frequent or more different in its incidence than among the general community.

A. A.

Corrêa da Costa (Clovis). **Nosologia regional de Pernambuco.**—*Arch. Brasileiros de Med.* 1920. June. Vol. 10. No. 6. pp. 275–338. With 1 text fig. and 13 charts.

An account of an official visit to the district of Mocambo, State of Pernambuco, Brazil, to determine the nature of an epidemic prevailing there in the summer and autumn of 1919. It was found that two epidemics were raging and had caused heavy mortality, one characterized by high fever, bilious and subsequently "black" vomit, anuria and multiple haemorrhages, and a coincident prevalence of stegomyia mosquitoes, the other by buboes and a coincident epizootic causing enormous mortality among rats. An intensive anti-stegomyia campaign was entered upon, with good results, General Lyster, of the Rockefeller Foundation, assisting with advice and co-operation. As regards plague, locally known as "peste do caroço" (literally "nut" or "kernel plague"), the author states that the disease "has been endemic over an enormous area of the interior of the State for the past six years, and it appears likely that there will be formed there, if not already formed, a focus of plague such as we have in British India."

F. S. Arnold.

Swan (John M.). **Medical Notes on the Dominican Republic and Haiti.**—*Amer. Jl. Trop. Med.* 1921. Jan. Vol. 1. No. 1. pp. 19–27.

A demographic sketch of the island of Santo Domingo, two-thirds of which, as the Dominican Republic, has been administered under the direction of the government of the United States since 1916. The prevailing diseases are shown in a table. Another shows the hospitals available and their equipment.

A. G. B.

VALLET. **Rapport sur le fonctionnement du service médical du Consulat de France à Tchong-King pendant l'année 1919.**—*Ann. de Méd. et de Pharm. Colon.* Paris. 1920. Dec. Vol. 18. pp. 105–109.

The commonest maladies at Tchong-King are syphilis and tuberculosis, "which decimate the population." Ulcers, cancers, cirrhosis of the liver with ascites, eye diseases, and skin diseases were also common. Two cases of phagedenic chancre were seen which had entirely destroyed the penis.

The author describes the housing of the population, and states that the mendicant fraternity, to the number of about a thousand, live in deep caves, opening in almost vertical cliffs. Here one meets with misery unmitigable and unutterable: in one wretched being the eyeballs, ears and lips had gone.

The number of cases treated in the hospital in 1919 was 1,424.

A. A.

THOMSON (J. Oscar). **Advanced Pathological Conditions observed in South China.**—*New York Med. Jl.* 1921. Apr. 6. Vol. 113. No. 11. pp. 530–534. With 4 text figs.

Seventy-five per cent. of the patients admitted to the Canton Hospital present advanced pathological conditions and are usually brought there by severe pain. Some of the more extreme are here described and figured. Tropical diseases do not make any large contribution.

A. G. B.

ELLIS (Aller G.). **An Analysis of One Hundred Postmortem Examinations in Siam.**—*Jl. Lab. & Clin. Med.* 1921. Jan. Vol. 6. No. 4. pp. 199–212.

The post-mortem examinations were made in Bangkok in 1919–1920: these, and others in the same period, covered 45 per cent. of the deaths. Most of the subjects were Siamese, but some Chinese are included. The primary or chief causes of death, as determined from the lesions and the clinical course of the disease, were as follows [conditions occurring less than three times not listed]:—

Abscess of pelvis	3	Endometritis, puerperal	3
Bronchopneumonia	5	Fatty degeneration of heart	3
Cholera	3	Myocarditis (chronic)	3
Cirrhosis of liver, atrophic	5	Tuberculosis (lungs)	10
Dysentery, amebic	17	Typhoid fever	3
Dysentery, type doubtful	3		

The author notes that more than a quarter were due to diseases of the intestines -dysentery, cholera, typhoid, and one case of ankylostomiasis.

A summary of the lesions found is given under the respective organs. Vesicular emphysema of the lungs was noted no less than 43 times. Minor degrees of this condition are almost constant in adults in Bangkok. Gross syphilitic lesions were rare. There were only 7 cases of pigmentation of the spleen, and 4 of the liver; this surprises the author, but he states that malaria is not so frequent in Bangkok as further north. There were 11 cases of tuberculosis—10 of the lungs and one of the hip. The tuberculosis process "does not appear so widespread, so active, so broadly destructive as in the average case in the United States . . . around the cavities may be found small tubercles, but

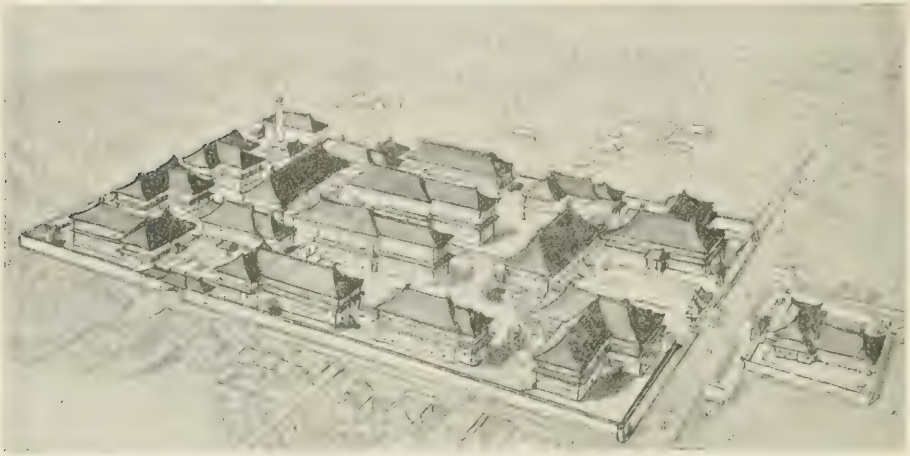
rarely any extensive areas of necrosis . . . the general appearance is that the tissue had been putting up a good resistance." In 11 other bodies there was healed tuberculosis in one or both lungs. It is noted that Bangkok is only 4 feet above sea-level, and probably not favourable for the tuberculous. There were 9 cases of tumour, 7 malignant and 2 benign. Intestinal parasites were 4—hookworm and tapeworm, one of each, ascaris 2. Of the amoebic dysentery cases three had lesions in the ileum ; in three also there was liver abscess.

A. G. B.

REVIEWS.

PEKING. **Peking Union Medical College. Annual Announcement 1921-1922.** 86 pp. With 6 figs. and 1 folding plan. Peking, China

That it is easier to make money than to keep it, and that it is easier to make money than to spend it wisely, are trite sayings : that it is easier to make money than to give it away without a great backwash of harm, would, no doubt, be equally trite if the giving away of life's winnings were a common practice among ordinary men. Sometimes, however, the Croesus



Peking Union Medical College. Perspective view, looking North East, of the new buildings (erected or proposed), on a site of approximately nine acres, for the medical school and hospital. The remaining buildings of the College, including the Pre-Medical School, dormitories and residences, are on other property near by.

Some of the College buildings as completed.

ideal and the Solon ideal, as these ideals are represented to us by Herodotus, are found united, and then we see money freely given for a purpose where even the bias and indirections of the cynic can hardly forecast anything but blessing to him that gives and him that takes.

These reflections must strike anyone who reads the " Announcement " of the Peking Union Medical College for the current year, a strictly business-like statement of a grandly designed and well-furnished enterprise from which imagination may indeed body forth the form of things unknown.

The college was founded in 1906 by the co-operation of several big American and British missionary societies, by whom it was maintained until 1915, when it was taken over and reorganized on a magnificent scale by the China Medical Board of the Rockefeller Foundation. The reconstituted college, all the buildings of which are of the most modern type, comprises a Hospital and all its appurtenances, a Medical School, a Pre-Medical School, a Training School for Nurses, and all the material requirements for religious instruction and social life and training.

The Medical School includes separate and distinct departments of anatomy (with embryology in association), physiology, pharmacology and physiological chemistry, pathology (with bacteriology and parasitology in association), medicine (with neurology and psychiatry in association), surgery (with röntgenology in association), obstetrics and gynaecology, ophthalmology, and otology, rhinology, and laryngology. Each department is administered by a professor, under whom is an assistant professor, and an associate professor where necessary, and associates and assistants. The language of instruction is English, and admission is contingent either on preliminary graduation in the Pre-Medical School, or on passing an entrance examination after furnishing evidence of previous graduation in some approved institution. The Medical School was opened for work in 1919, but will be formally opened with the entire Institution in September of the present year. The course of instruction, including one year of special work in the laboratories or hospital, occupies five years ; students of both sexes are admitted ; and the total individual expenses for a school year, inclusive of accommodation, board, books and incidentals, amounts to something between 200 and 250 dollars of Peking silver currency.

The Pre-Medical School, which was opened for work in 1917, is a fine modern building situated near the Medical School. It contains separate departments of biology (mainly animal biology), chemistry, and physics. Each department is administered by a head who has the status of assistant professor, and is staffed with an instructor and one or two assistants. This school also includes a department of Chinese, and a department of Modern European Languages (English, French, and German), for the ample design of the founders not only comprehends accessible portals to Western thought and science, but also foresees a time when medical education will extend to the vernacular plane. Admission is by examination in English, mathematics, and Chinese composition. The course of study occupies three years.

Both in the Medical School and the Pre-Medical School there are scholarships and studentships for responsible service.

The Training School for Nurses was opened in 1920. The course, which extends to four years, including one year in the Pre-Medical School (or its equivalent of work), is a most comprehensive one, embracing nursing, house-keeping, hygiene, cookery, dietetics, massage, etc., and also anatomy and physiology, pathology and bacteriology, physics and chemistry, materia medica, surgery, medicine, obstetrics and gynaecology, ophthalmology, and even clinical microscopy ; also, during the first three years, instruction in English and Chinese.

The government of this beneficent institution is vested in a board of 13 trustees, six of whom are appointed severally by the six missionary societies that initiated the college ; and seven by the China Medical Board of the Rockefeller Foundation.

A. Alcock.

KEANE (G. J.) [D.S.O., M.D., Ch.B., D.P.H., D.T.M., R.A.M.C.] & TOMBLINGS (D. G.). **The African Native Medical Corps in the East African Campaign.** With a Foreword by Sir Robert T. CORYNDON, K.C.M.G., Governor of the Uganda Protectorate.—63 pp. With 5 plates. London: Richard Clay and Sons, Ltd., Brunswick Street, Stamford Street, S.E.1.

The African Native Medical Corps, raised for service in the East African Campaigns of the Great War, was recruited to begin with from the youths educated in the Mission Schools of Uganda, its strength being at first 40 men. Some misgiving might have been felt at the initiation of the experiment, for the native of Uganda, though highly intelligent, seems to be something of a Hotspur in temperament—infinitely proud, and resentful of indignity, but faithful and self-sacrificing if treated with consideration. Ultimately the corps reached a strength of ten British Officers, and 1,500 men representing nearly all the tribes of British and "German" East Africa. The wonderful success of the experiment is best described in the words of Major H. B. Owen, D.S.O., to whom the Commanding Officer, Major G. J. Keane, D.S.O., gives unstinted credit for his organising ability:

"At first, lack of African N.C.O.'s necessary for the maintenance of discipline, and to assist the British *personnel* in training recruits, was a great handicap. Suitable men, however, were rapidly trained and a permanent depot staff formed. It was realised that beyond imparting technical knowledge it was highly important to teach discipline and conduct. Many fail to appreciate how little the average African knows of obedience. Discipline in the home hardly exists with them, often it is the custom for children to be brought up by indulgent relatives. Recruits were ignorant of the meaning of simple obedience as the English schoolboy understands it, and certainly had no idea of the meaning of Army discipline. Hence, 'Barrack square' training was made a primary feature of the depot course of instruction, in order that habits of obedience, punctuality, promptness and smartness might be inculcated. With the object of eradicating the idea that manual work is degrading, often the belief of the educated African, one hour's fatigue was included in the daily routine. The importance of physical training was recognised, the first parade of the day being devoted to this. Not only did rapid improvement in bearing and physique result, but alertness both of mind and body was developed. The technical side of the training consisted of lectures and demonstrations in first-aid, nursing duties, and camp sanitation. A special point was made of teaching correct conduct towards Europeans and a sympathetic attitude towards patients. Africans are not naturally sympathetic towards the sick. Sometimes, indeed, the ill and weak are actually neglected. Sympathy had therefore to be taught; insistence on the fact that it is a virtue developed in civilised peoples appealed to the African, who considers himself on the road to civilisation. As time went on, not only were no untrained men drafted out of the depot, but men were sent to units to replace those who had not been through the depot course, these latter returning to the depot for instruction.

"There is no doubt that the lad who enlisted in this corps not only rendered useful service to the country, but also himself greatly benefited by military service, character, mind and body being developed in a way which would never have otherwise been possible."

The Governor of the Uganda Protectorate, H.E. Sir Robert Coryndon, contributes a "foreword" greatly appreciative both of the character of the people and of the agricultural possibilities of their country.

A. Alcock.

(i) Hunter (William) [C.B., Col. A.M.S.]. **The Serbian Epidemics of Typhus and Relapsing Fever in 1915, their Origin, Course, and Preventive Measures employed for their Arrest. (An Aetiological and Preventive Study based on Records of British Military Sanitary Mission to Serbia, 1915)**.—Reprinted from the *Proc. Roy. Soc. Med.* (Sect. of Epidemiol. & State Med.). 1919. Vol. 13. pp. 29–158. With 1 map and 21 charts. 1920. London : John Bale, Sons, & Danielsson, Ltd.

(ii) Strong (Richard P.) [M.D., S.D.], Shattuck (George C.) [A.M., M.D.] Sellards (A. W.) [A.M., M.D.], Zinsser (Hans) [M.D.], Hopkins (J. Gardner) [M.D.]. **Typhus Fever, with Particular Reference to the Serbian Epidemic.**—x + 273 pp. With 26 plates and 22 charts in text. 1920. Cambridge, Mass. : Published by the American Red Cross at the Harvard University Press.

These two publications, referring as they do mainly to the same outbreak of the same disease, may conveniently be considered together. Colonel Hunter's book is a purely epidemiological study, whilst that of Dr. Strong touches chiefly on the clinical and bacteriological aspects of the disease, though he gives in addition a short history of some earlier outbreaks, and at some length discusses the later epidemic in Poland.

There can be no doubt of the value of Colonel Hunter's monograph. It may be taken as a model of a paper of this kind. The essential points of the problem presented are clearly and briefly stated. From these we pass to the logical deduction of the measures necessary to cope with the problem, the organisation of these measures, and a record of the course of the epidemic before and after their application. It is all as clear as a problem in Euclid. If one were inclined to carp one might urge that the problems of epidemiology are not so clearly drawn as those of geometry, and that there is always the danger of falling into the *post hoc propter hoc* fallacy. Apparently Dr. Strong feels this, as in a note on page 88 of his work he throws doubt on the efficacy of Colonel Hunter's "key" measure, the stoppage of railway traffic.

Personally I believe that the cessation of the epidemic was mainly due to the dissemination of simple measures of disinfestation throughout the whole country. Colonel Hunter's argument is supported by figures of cases treated in hospital, and fresh cases of disease occurring, on the several dates before and after suspension of railway traffic. I confess to a somewhat less simple faith in statistics, especially statistics gathered at a time of such appalling confusion and distress as the pages of both these books reveal. That Colonel Hunter's measures were well planned is clear, that they were carried out with untiring energy and devotion to duty, I, having worked both with him and Lieut.-Col. Stammers, feel confident, and it is no less obvious that they were followed by success. Whether the connection of cause and effect was so close as Colonel Hunter would have us believe, it remains a fact that no epidemic of equal severity has ever been cut so short.

Colonel Hunter's monograph is a model of statement, since it leaves the reader in no doubt as to what the writer means, why he acted, and how he acted—moreover, there is no superfluous padding. *O si sic omnes !*

Dr. Strong's work is of a totally different calibre. As I have said, a large portion (over one-third) deals with a clinical study of the disease, and this is very good. The systematic account of the complaint as it affects the various systems and regions of the body is very full, and the cases of which

detailed description is given are well selected. Equal praise can be accorded to the other sections on bacteriology. In fact the book presents the best systematic account of Typhus available.

Fault has, however, to be found with it on two most important points. Such a book ought to be a tool for use by subsequent workers. The ideal tool is handy, and unencumbered by unnecessary adornment. Now, the first essential for handiness in a book of reference is a good index, the second is clear headings and marginalia. This book contains neither, and without them it loses nine-tenths of its potential value.

The absence of an index is perhaps the worst defect, but this might be remedied if page headings and marginal headings gave an accurate guide to the contents. There is but one page heading: "Typhus" on the even numbered pages, and "The Serbian Epidemic" on the odd—till we come to page 109. Then we get "Clinical Observations" and "Typhus in Serbia," similarly distributed, up to page 175. It is true that paragraph headings are given in this second section, but these do not occur on every page. And so on. The Table of Contents does little to help.

As regards unnecessary adornments, there are numerous photographs, a few convey useful information; most, however, are of mere topical interest, such as "A Filled Cess-pool," which might be anywhere, "A Typical Serbian Village after Eradication of Typhus," which might be any Balkan village under almost any peaceful conditions. These come in "clumps," two, three, or even four plates at a time in the middle of the text. They add to the weight and thickness of the book, and as sometimes they come in the middle of a sentence they interrupt most annoyingly one's line of thought. The matter of the book is so good that it deserves a better form of presentment.

C. H. Melville.

McCarrison (Robert). [M.D., D.Sc., Hon. LL.D. (Belf.).] **Studies in Deficiency Disease.**—xvi + 270 pp. With 82 text-figs. 1921. London: Henry Frowde and Hodder & Stoughton. (Oxford Medical Publications.) The Lancet Building, 102, Bedford Street, Strand, W.C.2. [Price 30*s.* net.]

The aim of this handsomely produced work is, in the author's own words, "to present the reader with a consecutive account of the results of recent experimental researches into the nature of Deficiency Diseases, and to point out the application of these results to their prevention." Beyond a brief though succinct summary of the new knowledge relating to vitamins (antineuritic, antiscorbutic, and fat-soluble) and the various pathological processes and symptom-complexes to which the lack of these vitamins in the food gives rise, the subject-matter of the book consists in the main of detailed descriptions of the author's experimental work on "Deficiency" disease in the last few years, and the deductions he draws for the practical guidance of the practitioner in the treatment of a multitude of somewhat ill-defined human maladies.

Col. McCarrison approaches the subject of "Deficiency" disease from a standpoint which, as he himself admits, differs essentially from that of other laboratory workers less blessed perhaps with that clinical acumen and imagination necessary to translate with ease pathological findings and symptomatology, as exhibited by the small animals of the laboratory, to the human sphere. He is less concerned with the demonstration of an end-result, such as scurvy, polyneuritis, etc., brought about by exhibition of a diet wholly deprived of the particular vitamin concerned, than with the sundry pathological effects on the various systems of the body produced

by partially avitaminic or ill-balanced and deficient diets generally. A reference of this wide character necessitates naturally a peculiarly intensive study of the pathological physiology, morbid anatomy and histology of laboratory animals, following the exhibition of dietaries rendered variously defective either in respect of specific vitamins or of certain proximate foodstuffs.

He has consequently throughout his experimental work with monkeys, pigeons and guinea-pigs paid peculiar attention to what he interprets to be genuine preneuritic or prescorbutic effects capable of direct application to human pathology. How far he has succeeded in this purpose only the accumulated experience of clinician, biochemist and experimental pathologist will tell, but there can be no question that McCarrison's methods of attack have opened up new ground, if its significance for human pathology is as yet but faintly understood. The book is divided into twenty-eight chapters, and numerous excellently reproduced photographs (mainly photo-micrographs of histological lesions) and carefully drawn and amply legended tables and charts are provided, together with convenient summaries of the matter discussed in each chapter.

The early chapters are devoted to introductory remarks on the main theme of the projected work and to a brief resumé of vitamin literature culled largely from the Medical Research Council's monograph. In these chapters he insists repeatedly "that the problems of nutrition must not be viewed from a too 'vitaminic' outlook," the vitamin being merely "one link in a chain of essential substances requisite for the harmonious regulation of the chemical processes of healthy cellular action," and he claims that the evidence he has to bring forward relating to the various pathological effects observed in animals will afford "a clearer comprehension of the manifestations of deficiency disease, using the term in its widest sense." Chapters follow in which are detailed his plan of experimentation with pigeons and monkeys and the dietaries to which he subjected them. These diets were essentially diets calculated to produce neuritic changes, and though nothing new emerges with the possible exception of certain symptoms interpreted as nerve lesions in monkeys (*e.g.*, wrist drop), which, I understand, no other worker has succeeded in eliciting, much useful information is given with regard to various factors (age, sex, idiosyncracy, etc.) influencing the rapidity of onset of the neuritic syndrome and fatal issue in pigeons. The author discusses at some length the question of bacterial infection as influencing or modifying the effects of deficiency disease. In the course of his experiments with pigeons a *B. suipestifer* infection broke out among the experimental animals while the controls, while possibly carriers of this organism, remained free from infection. The presumption was that the resistance of the gastro-intestinal tract to bacterial infection was so reduced by the food deficiency that a generalized infection supervened. It was of interest also that this particular strain of *B. suipestifer* could itself, when inoculated into healthy pigeons, produce paralysis—an effect which the author later employs in developing his argument relating to the different clinical types of beriberi. Here he postulates one form due to food deficiency alone, a second in which the neuritic effect is precipitated by infection, fatigue, etc., and a third which may be of purely infective origin. The latter form should, in the reviewer's opinion, be known simply as infective polyneuritis or polyneuritis of unknown origin and not as beriberi till further knowledge emerges.

Considerable space is devoted to the symptoms exhibited by experimental animals before any end-effect such as neuritis supervenes. Those observed include loss of appetite, diarrhoea, fall in the respiration rate, fall in body temperature, anaemia, asthenia, etc., but of all these he lays perhaps greatest stress on diarrhoea as being one of the earliest and most frequent manifestations of deficiency disease in pigeons. The diet of autoclaved rice exhibited contained according to the author no vitamins but an excess of starch and a deficiency of protein, fat and salts. In his

keenness to find a practical application to human pathology he suggests that "microbic fermentation of the ill-digested starch (as seen in the faeces of the animals) results in an excessive production of mineral and organic acids which, on absorption, may presumably lead to a condition of acidosis." That diarrhoeal conditions are liable to occur in animals on deficient diets is well known. On the other hand, especially in monkeys kept in captivity and normally dieted, outbreaks of amoebic and bacillary dysentery are not uncommon. In smaller animals, such as rats fed on certain defective diets, I understand from experts I have consulted that diarrhoea may occur, but it is by no means an invariable concomitant. Guinea-pigs on a scorbutic diet are, in fact, invariably constipated. In starvation it is known that diarrhoea and catarrhal affections of other mucous surfaces such as the conjunctivae, are very constant features, which readily yield, if the condition has not gone too far, to the exhibition of suitable food. The author, while rightly insisting on the importance of infection as liable to intervene with a gut whose resisting power is weakened by deficient dietary, must not generalize too readily in applying this experimental fact to human pathology. Even the demonstration by histological methods of congestive, haemorrhagic and ulcerative lesions in the gastro-intestinal tracts of experimental animals, to the minute description of which McCarrison devotes many chapters, cannot, in the reviewer's opinion, be held to represent anything more than casual disturbances due to a combination of factors of which bacterial infection is probably the most important. Nutritional diarrhoeas both in infants and adults were recognized long before the days of vitamins, but until we know more of the effect produced on the intestinal flora by deficient food or strange food of any kind it would be unwise to exclude other than dietetic procedures from the practitioner's armamentarium in the numerous vague intestinal upsets he has to deal with. Other symptoms, such as anaemia (determined by general pallor), asthenia, headache (judged from the fact that the monkey in question was observed to hold his head between his hands) are all duly chronicled as essentially symptoms following the exhibition of deficient food. Gravimetric observations on the organs of experimental animals yielded some highly important results and McCarrison's discovery of enlargement of the adrenals in pigeons fed on diets deprived of antineuritic vitamin is of particular interest as demonstrating the implication of the endocrine organs in deficiency disease. The increased adrenalin content is, by McCarrison, brought into relation with malnutritional oedemas and the wet forms of beriberi as a possible causative factor, but it would appear from later work of Kellaway, who confirms McCarrison's observation, that the increased adrenalin content is most probably a storage effect following lowered metabolism, and that the increased volume of the glands is due simply to oedema of these organs. McCarrison showed that inanition *per se* (exhibition of water only) was followed by increase in weight of the adrenals, so that this phenomenon cannot be set down primarily to lack of any particular vitamin. He demonstrated in fact that diets lacking in other specific vitamins are accompanied by adrenal enlargement.

The concluding chapters of the book deal with practical applications of the experimental results in animals to human pathology, and especially to the ill-defined group of acute and chronic intestinal disorder, intestinal stasis, ulcerative colitis, etc., where the author plumps rather unreservedly for dietetic treatment as best calculated to yield miraculous cure. In this sphere one may merely say that clinical opinion is at present hopelessly divided, and until further knowledge emerges, it would be unwise to ignore the trial of other weapons calculated to improve bodily tone and increase the power of resistance to bacterial infection.

J. C. G. Ledingham.

Overbeck-Wright (A. W.). [M.D. (Pysch. Med.), M.B., Ch.B., M.P.C., D.P.H., Major I.M.S., Superintendent, Lunatic Asylum, Agra.] **Lunacy in India.**— x + 406 pp. 1921. London: Baillère, Tindall & Cox, 8, Henrietta Street, Covent Garden. [Price 21*s.* net.]

Major Overbeck-Wright has succeeded in covering a great deal of ground in a comparatively short space in his book, "Lunacy in India."

The chapter dealing with the statistical side of the matter is interesting, in that it shows how little provision is apparently necessary for the institutional care of the insane in India, a total accommodation for 7,243 out of a population of roughly 260 million people being ludicrous when judged by European standards. This is accounted for, however, by the fact that the native is so prejudiced against institutional treatment in cases of mental disorder, that only the more active and violent individuals are relinquished from home care, and that the degree of social complexity does not necessitate the alienation of so many of the feeble-minded as is the case in England.

The medico-legal aspect of the treatment of the mental case is dealt with very thoroughly, and as this is the issue which is most prominent from the general practitioner's point of view, the book should prove very helpful to all medical men who have to handle the mental case under the Indian Law. It is to be noted, however, that as the Indian is based on the English Lunacy Act, there are not many divergences between the two.

In a brief chapter the author considers the relationship of Western to Eastern psychoses, and he corroborates, from his long experience, the generally accepted view that, although the ideational content or the colouring of the mental state varies with the particular social surroundings of the patient, the general types of mental disorder are the same the wide world over. He describes the essentially Eastern condition of "Latah," which he considers is purely a special hysterical manifestation and the psychosis resulting from the Eastern habit of taking *Cannabis indica*. There is also an interesting reference to, and an explanation of, the curious prevalence of microcephalic imbecility in the Punjab.

Apart from the foregoing, the book may be regarded as a textbook of mental disorders in general, and in it Major Overbeck-Wright carries out his aims, as he avows in his preface, of drawing attention to the importance of toxaemias as aetiological factors in the production of a large proportion of the cases, and of placing on record the views he has gained from his experience of 19 years at this special work. Such being the admitted purpose of the book, it can be at once stated that, with all regard for the length of Major Overbeck-Wright's experience, and the value of the views he may have derived, his insistence on the toxaemic factor and his indifference to the progress of psychological knowledge detracts greatly from the worth this book might have had as a contribution to modern psychiatrical medicine.

Not a great number of years ago psychology was a barren science applicable only to the laboratory and belonging only to the professor or to the abstract philosopher, it had no reference to the study of mental disorder, the clinical psychiatrist disregarded it and, being a medical man, he fell back on such explanations as were provided by pathology for his rationalization of cause and effect in mental disorder. This was the state of affairs in the year 1906 when Bruce produced his work, "Studies in Clinical Psychiatry," in which all mental conditions save those arising from exhaustion or from actual trauma of a physical nature were ascribed to some toxic influence of some kind or another. Bruce went so far as to say in his preface that only by divorcing psychiatry from psychology could real progress be made; fortunately, however, and due primarily to the utter failure of the bacteriologist to throw any real light on the matter, psychology has become very closely associated with the study of mental disorder. It

is now generally recognized that the psychoses proper are the manifestations of the failure of that most important function of living matter, that of maintaining the adaptation to the environment, and this failure is not to be ascribed to some adventitious toxaemia arising from the presence of bacteria or from a disturbance of the metabolic activities, but to some much more deeply seated defect in the biological structure. Thus, MOTT has recently completed a research which goes definitely to show that the basis of the condition of Dementia Praecox is the failure of the power of the cortical cell to absorb oxygen, and so to continue functioning.

Major Overbeck-Wright has derived his ideas from and has based his own book on the work of BRUCE referred to above ; indeed, a comparison of the two books shows that the views expressed are practically identical. It is now the practice to regard the presence of a leucocytosis, on which BRUCE and Major Overbeck-Wright rely for their evidence to support their toxaemic theories, as an indication that the physical health of the patient requires careful attention lest the attempt to relieve the mental state be frustrated by the development of some fatal physical illness. Owing to the modern methods in vogue for the treatment of mental disorders, a more healthy existence is possible for the patient, so that a leucocytosis is not so commonly observed as formerly.

In dealing with the mental states associated with nervous disease, the book is quite sound and interesting, General Paralysis of the insane being regarded, for instance, as a primarily nervous disease with secondary mental manifestations. Even here, however, there is evidence of a failure to keep in touch with modern work, for, though the author definitely regards the condition as syphilitic in origin, yet he does not include any reference to the important fact of the finding of the *Spirochaeta pallida* in the cortex of the brain of the General Paralytic by NOGUCHI in 1913.

In conclusion it is to be said that Major Overbeck-Wright has produced a well-written and well-arranged book. He has stated his views dogmatically, admittedly a courageous thing to do in these days, and they are views which will find favour in certain quarters, but which, in the opinion of the reviewer, are not to be regarded as compatible with a true understanding of the nature of mental disorder as it is regarded by the consensus of modern psychiatrical opinion.

Thomas Beaton.

As has already been announced, publication of the Lists of References will cease with the current volume (December). Should any Institution which publishes indexes of this kind wish to use for this purpose the MS. slips from which the Lists are made up, application should be made to the Bureau.

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